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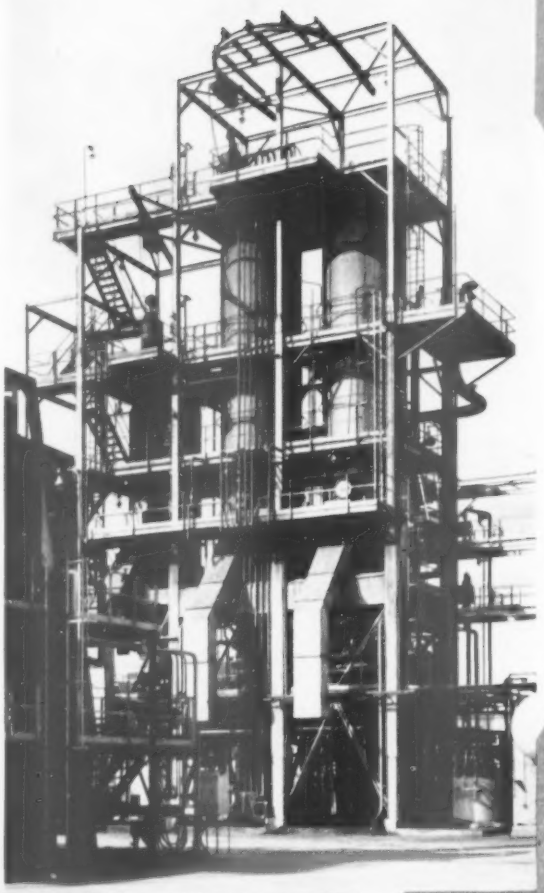
PRICE 50 CENTS TABLE OF CONTENTS ON PAGE 1 AUGUST 3, 1953

PHOSPHORIC REACTOR and CATCH POT

Built of Stainless Steel

At the Scottish Oils, Limited, Grangemouth, Scotland refinery located on the Firth of Forth, there is a phosphoric acid plant with two phosphoric reactors and a catch pot built by Chicago Bridge & Iron Company. These vessels are made of ASTM A-240, Grade M, Type 316, stainless steel. The 30-in. flanged and dished heads on top of the reactors are A-285, Grade C, firebox steel lined with solid nickel. The dome head of the catch pot is also made of A-285, Grade C, firebox quality steel but is not lined. Several other alloys were used for fittings and piping connection and a number of internal grid plates are made of solid nickel.

The two 9-ft. 3-in. diam. by 38-ft. phosphoric reactors and the 8-ft. 6-in. diam. by 22-ft. catch pot illustrate the type of structures we are equipped to build for corrosion-resistant service. Production experience, skilled personnel, and complete shop facilities assure refineries and petro-chemical plants the best in construction. Write our nearest office for estimates or quotations on any welded steel plate structure you plan. There is no obligation on your part.



Right: Phosphoric acid plant at Scottish Oils, Limited, refinery showing the two reactors and the catch pot.

Below: The two phosphoric reactors and a catch pot ready to leave our Birmingham, Alabama plant for the Scottish Oils, Limited refinery at Grangemouth, Scotland.

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the OIL AND GAS JOURNAL

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In Brief . . .

1. MODERNIZED REFINERY . . . New facilities at the El Dorado Refining Co. plant include a 4,300-bbl. per day fluid catalytic cracking unit. This latest expansion and modernization of the El Dorado refinery was primarily prompted by octane requirements. The new cat cracker instrumentation includes an alarm system which will operate if any one of 13 process variables is upset. Existing equipment was employed for the feed-preparation section.

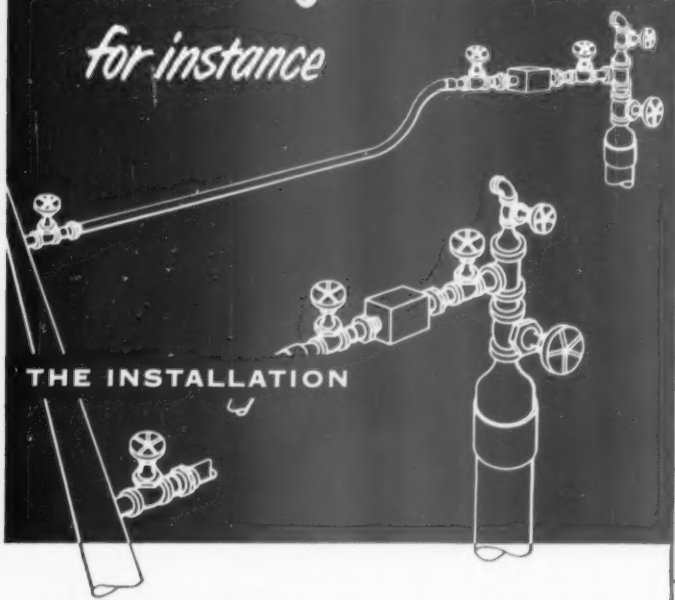
2. PRODUCTION DAMAGE . . . Tests to determine extent of water damage to oil-well productivity show: (1) Water sensitivity of an oil formation does not directly indicate the effect of water on oil productivity; (2) the oil productivity of some consolidated water-sensitive oil sands can be restored by flow of oil after invasion of water; and (3) the permeability to reservoir water may be indicative of the effective oil permeability in the reservoir.

3. CORROSION DETECTION . . . Ultrasonic equipment can provide practical and accurate means for locating and measuring corroded areas inside a pipe line and for discovering defects in the pipe wall. Because of its narrow ultrasonic beam, pits can be detected and their depths measured. Still to be developed are a method for rapidly scanning the pipe surface so as to include all corroded areas, and a means for assimilating the mass of information produced by a complete and rapid scan.

4. SAFETY IN THE FIELD . . . An increase of 80 per cent in the last 8 years, from $2.76 in 1945 to $4.97 in 1953, has been experienced in manual rates for workmen's compensation for Texas oil and gas lease work. A group of Texas contractors reported compensated cost of 1,853 recent accidents at $429,065 to the Texas Employers Insurance Association. In the light of these figures an accident analysis has been prepared for the benefit of oil and gas-well contractors.

5. ACRYLONITRILE . . . Cheaper acrylonitrile is foreseen when a new plant, now under construction by American Cyanamid Co., begins operation next year. A new process will be employed, starting with natural gas to make acetylene and ammonia. The ammonia is reacted with more methane from natural gas to make hydrogen cyanide and this, in turn, is reacted with acetylene to make acrylonitrile. New uses for acrylonitrile and its derivatives are anticipated.

Valve Performance that Speaks for itself ...on Well Injection Service, for instance



VALVE SERVICE RATINGS

SUITABILITY:	Best by test
FEATURES:	Hard, tough, nickel alloy disc
MAINTENANCE COST:	Routine care only
SERVICE LIFE:	Now in line more than 4 years
OPERATING RESULTS:	Proper control of system
AVAILABILITY:	Crane catalog item—No. 624E

In the Kansas field operations of a prominent oil company, with Crane Bronze Gate Valves on injection lines to wells for oil production by water flooding. Working pressure approximately 900 psi.

THE CASE HISTORY

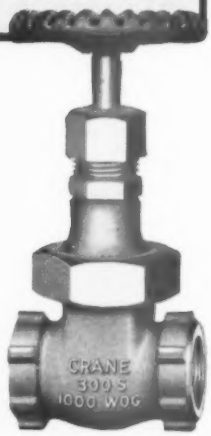
Originally, this well-flooding system was installed with plug valves which proved a severe handicap. Corroded by the salt water, the valves stuck so hard they couldn't be operated to cut in or shut off wells on the line.

Iron body valves also were tried, but gave no better results. They corroded and leaked, losing much needed pressure.

More than 4 years ago, Crane No. 624E Bronze Gate Valves were put on the system. Corrosion and leakage were eliminated. Valve operation became smooth, easy, positive—the way it should be. And, ever since, that's how these Crane valves have performed. No wonder this producer, like many others, has hundreds of them in similar service.

THE VALVE

Crane No. 624E gate valves have unusually heavy metal sections and are ruggedly constructed throughout for high pressure service. Body and bonnet are of Crane Special Bronze, a high-grade leaded tin bronze. Disc is of hard, tough Crane Nickel Alloy. Better Crane quality in every detail makes them last and last. Sizes up to 2 in. rated at 1,000 psi. W.O.G. See your Crane Catalog or ask your Crane Representative for demonstration.



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All of the load-carrying cords in grommet belts are concentrated in twin grommets. These grommets are cord loops, made like giant twisted cables except that they're endless. Since there are no center cords, the grommet belt is more flexible, and so can "give" temporarily and absorb shock loads. As a result, grommet belts last 20 to 50% longer, depending on the service. (The more severe the service, the greater the increase over ordinary belts.)

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The section where cords overlap is the weak spot in ordinary belts. That's where 80% of V belt failures occur. But in grommet V belts this cause of belt failure has been eliminated. The grommets are endless. There are no splices or overlaps—no weak spots to cause premature belt failures.

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Grommet V belts have more rubber in relation to belt size. Without any stiff overlap, they're more flexible, grip sheaves better. Size for size, grommet belts give ⅓ more gripping power with less slip, pull heavier loads with a higher safety factor. And because there is less slip, there is also less surface wear.

Less stretch

In ordinary belts under tension, the center cords loaf, the outer cords overwork because tension is greater near the driving faces. Grommet belts, with no center cords, have much more strength and less stretch. Grommet belts stretch, on an average, only about ⅓ as much as ordinary belts.

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Grommet V belts were developed by B. F. Goodrich to give V belt users more for their money. No other belt will stand so much punishment or last so long. Yet the savings they can make for you will be clear profit because grommet belts cost not one cent more than ordinary V belts.

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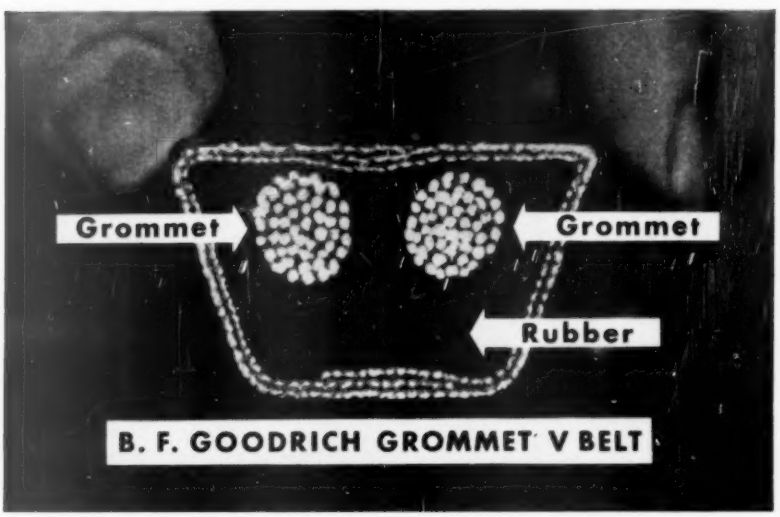

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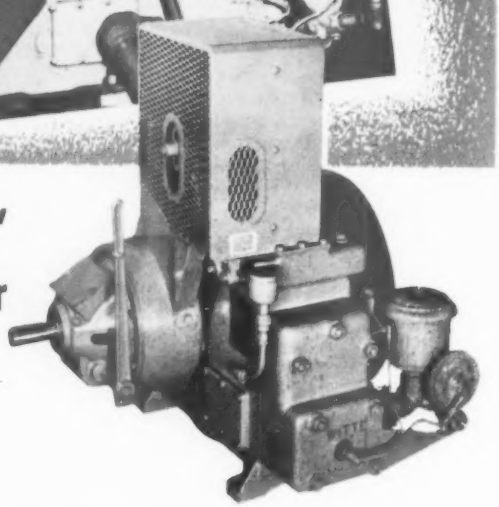
. . . the Oil Field WITTE Model "98" . . . designed especially for your smaller pumping installations.



• The Witte Model "98" is a gas-gasoline, horizontal, single cylinder, condenser cooled engine with single flywheel and lever-operated clutch power take-off. It has a medium speed range of 500 rpm to 1200 rpm and, for continuous 24-hour-day operation, is rated from 4 to 10 horsepower.

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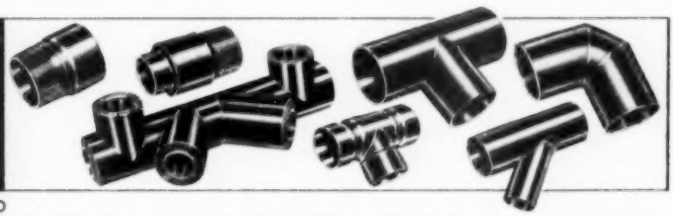

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CARLON plastic pipe is produced in Texas, Colorado, Ohio, Oregon, North Carolina and Acton, Ontario, Canada.

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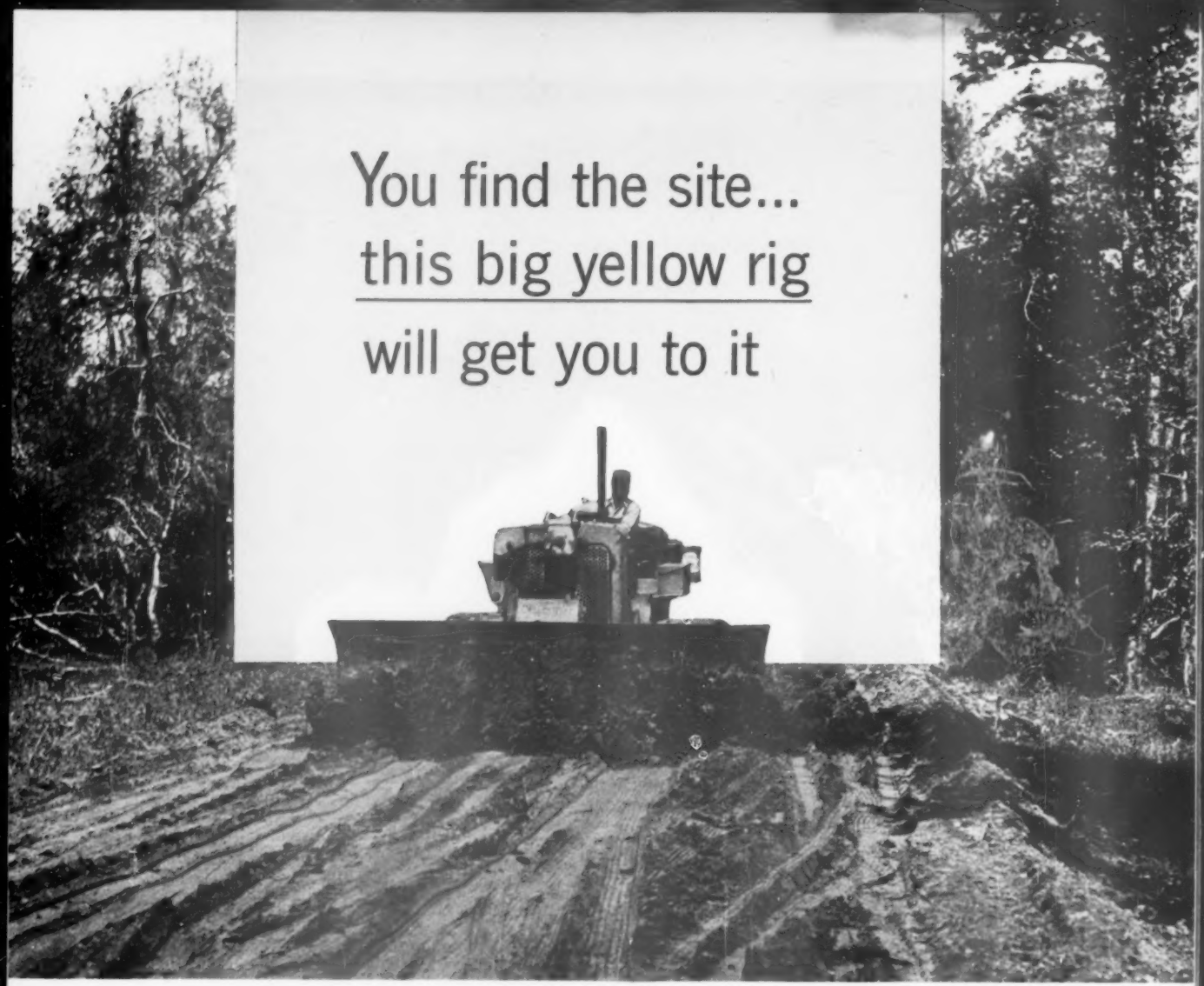

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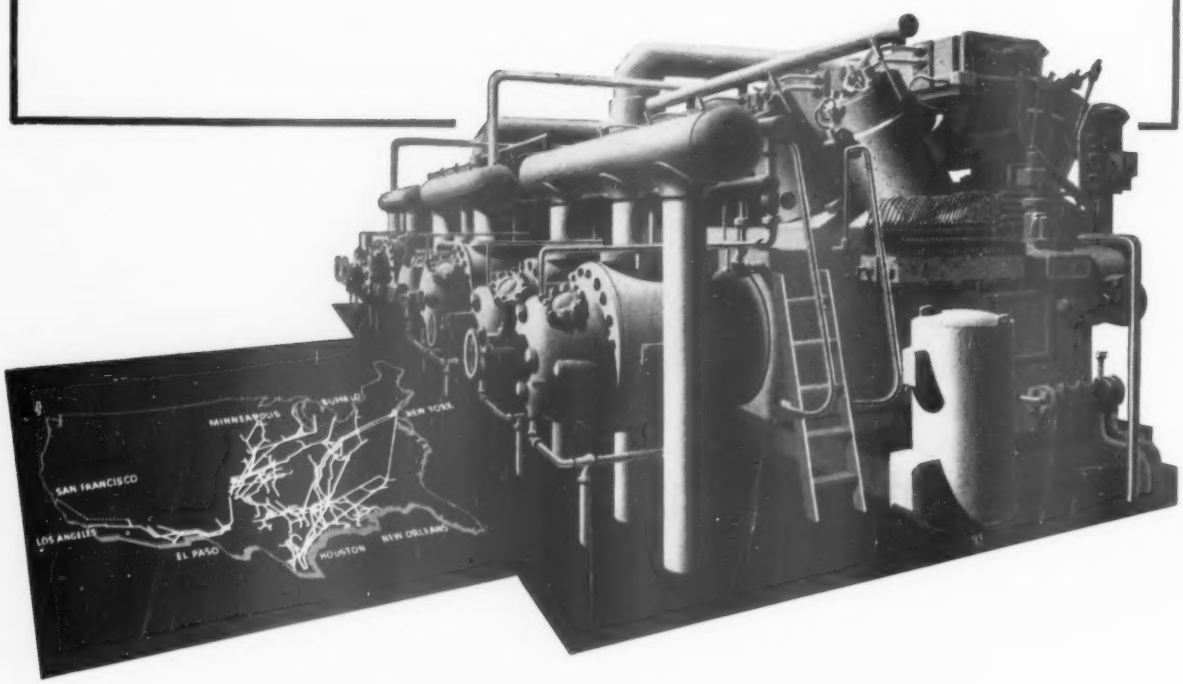

Here's the lubricant you can depend on to help keep your pumping stations operating smoothly and continuously—Gulf Security Oil. It provides effective protection for cylinders and bearings in both engines and compressors.

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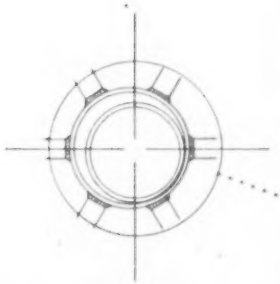

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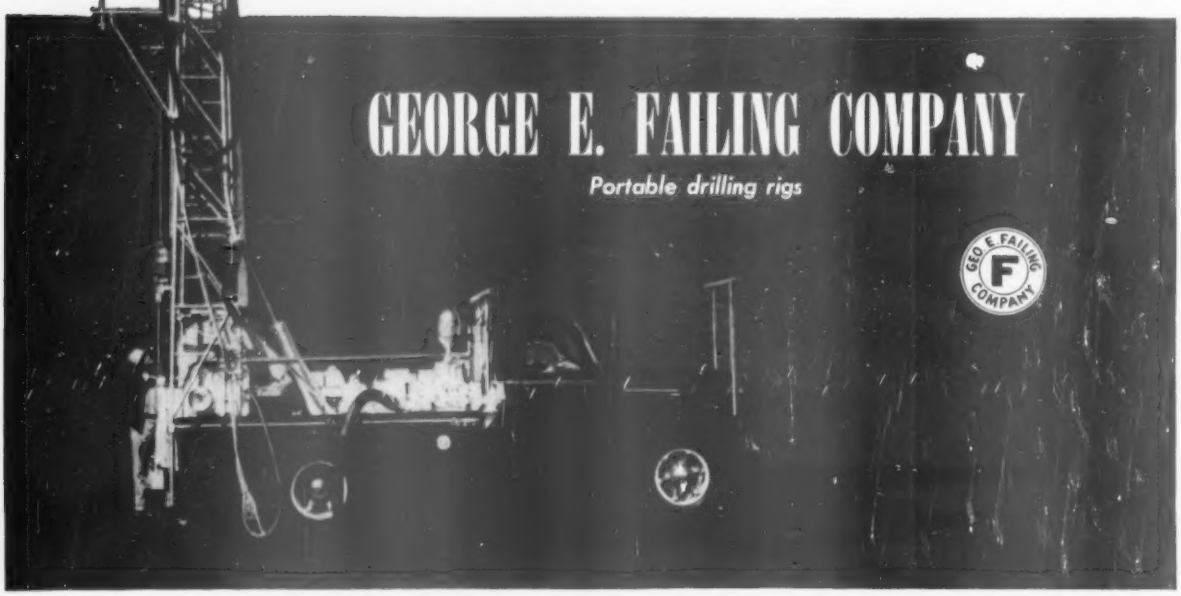

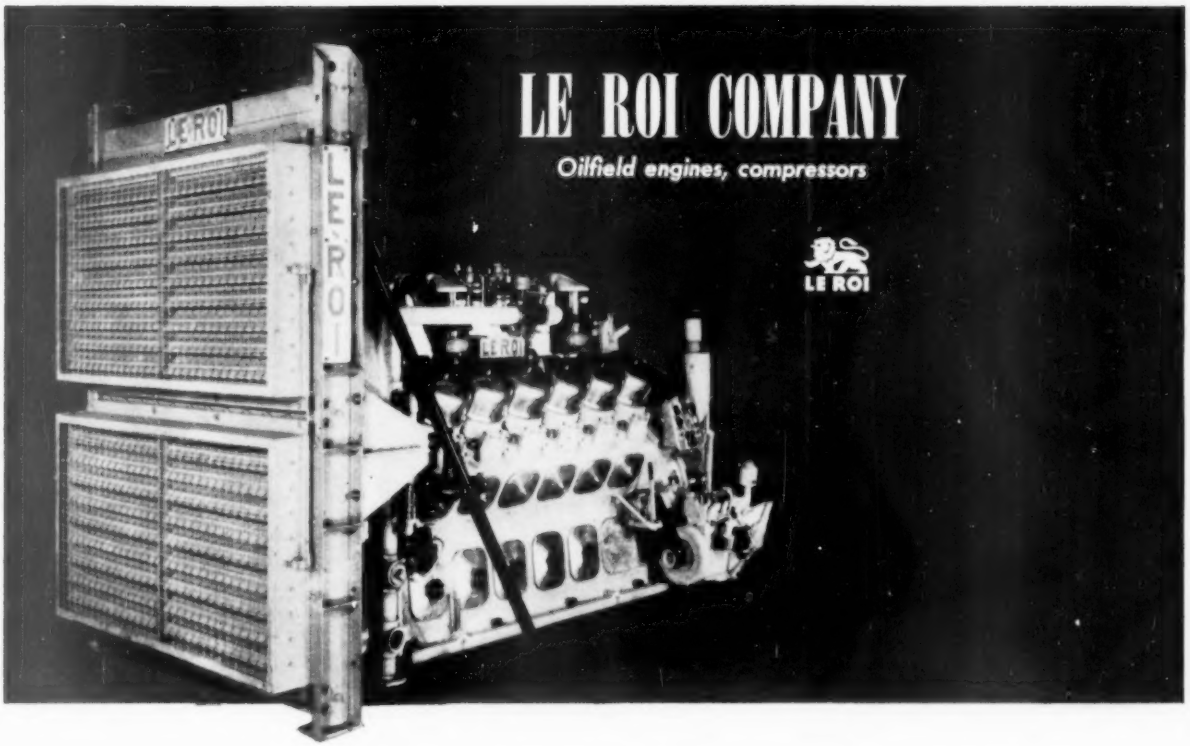

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new team

Individually, these three companies have contributed greatly to the progress of the oil industry:

Westinghouse Air Brake pioneered pneumatic controls for drilling rigs.

Le Roi pioneered internal-combustion engines for powering drilling rigs.

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Every Hycalog unit equipped for:
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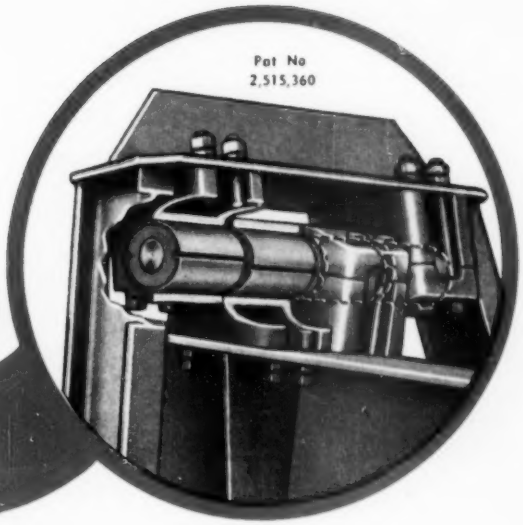

This Equalastic* Bearing, like the tires and spring shackles on your car, is made of tough rubber. Torsional deflection, in lieu of metal-to-metal, takes care of the oscillating movement. There is no friction, and therefore no need of lubrication.

This rubber bearing also has the obvious advantage of absorbing well shocks and high frequency vibration from the prime mover. Dynagraph tests show a substantial reduction in maximum polish rod load.

Your J&L supply store can recommend for any well a Cabot unit that will do a dependable, economical job. There are 15 basic sizes and more than 35 assemblies. A Cabot owner can change reducers if his requirements change.

You'll like everything about Cabot pumping units and the service that goes with them. Delivery to your lease can be made on Cabot trucks in charge of men trained in assembly and service.

Let's talk Cabot right away!

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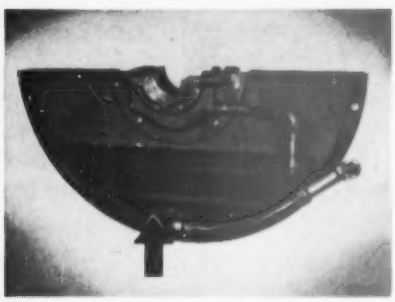
Sealed air-cooling in these pipe line motors by ELLIOTT



Even the lube oil is air-cooled

No complex water lines are needed here. Incoming ventilating air sweeps past the fins on the walls of the oil reservoir, taking heat with it. The picture is an inside view of a bearing bracket.

The three 2500 hp, 2-pole Elliott motors shown above are driving centrifugal gas compressors in a new mid-west station of a large pipeline company.

These motors are eminently qualified for this service by their rigid fabricated steel construction and careful workmanship. Their modern base-ventilated enclosure, designed on the basis of experience gained with many base-ventilated 2-pole motors in 23 years of pipe line service, seals off all the air from the building and eliminates the need of a separating wall between compressors and motor room. Ventilating air is brought in from the outside through a duct, with connection to the base of each motor. A similar duct discharges the heated air outside.

For full details on these and other Elliott large motors, contact your local Elliott engineer or write Elliott Company, Ridgway, Pa.

ELLIOTT Company

RIDGWAY DIVISION

FOR MOTORS 1-200 HP, CROCKER WHEELER DIV. AMPERE, N. J.

R3-11

Web Wilson 75- and 125-ton *Hydra Hooks*

Famous Web Wilson "Dash Pot" Action
Full 7" Spring Travel
Fewer Parts, Less Maintenance
Shorter Length, Streamlined Design
A Safety Factor of 4 to 1

The new 125-ton Hydra Hook was shown for the first time at the 1953 I.P.E. in Tulsa—after having been field tested for over a year. It combines the outstanding features of the "Field Proven" Web Wilson Connector Hooks with many improvements, such as: the elimination of a top bearing; a completely packed off body, to prevent oil leakage and keep the dash pot action at peak performance. It's a full 8" shorter and 1,200 lbs. heavier than its predecessor. A dream in streamlining, its additional weight and perfect balance make even the lightest traveling blocks fall *fast* and *true*.

AVAILABLE NOW—the 75-Ton and 125-Ton
READY SOON—the 200-Ton and 300-Ton

for additional information write ...

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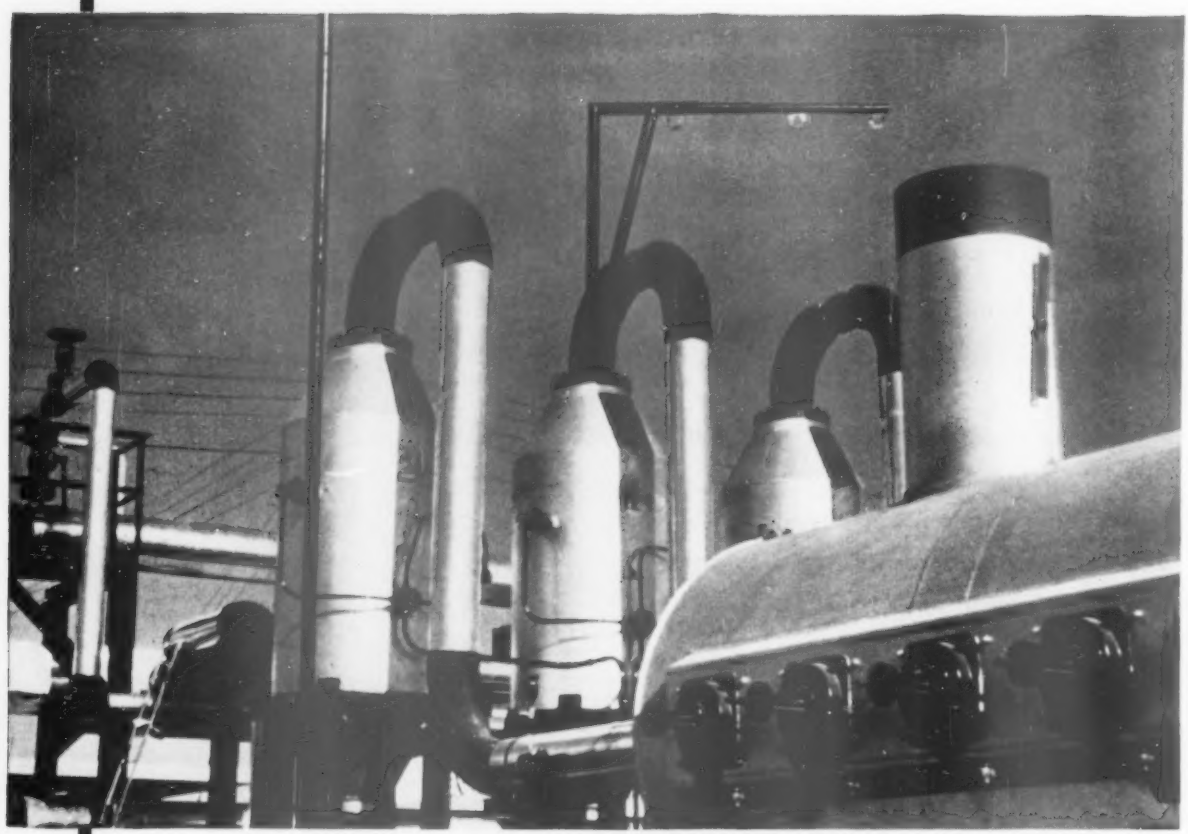
CATFORMING EXCEEDS ALL



McBride Refinery's Catforming unit at La Blanca, Texas

IN CATALYTIC REFORMING

IT'S THE CATALYST

PLANT GUARANTEES!

McBride Catformer completes initial run. Here are the startling results:

- In its initial run, all guarantees—including throughput, catalyst life, and yield octane—were exceeded.
- Starting with a 30 octane, C4 to 400° F. end point naphtha, the McBride-reformed gasoline has met final gasoline specifications throughout its entire running.
- No expensive feed preparation or product treating is required.
- The ability to regenerate the catalyst in place has been successfully demonstrated at McBride.

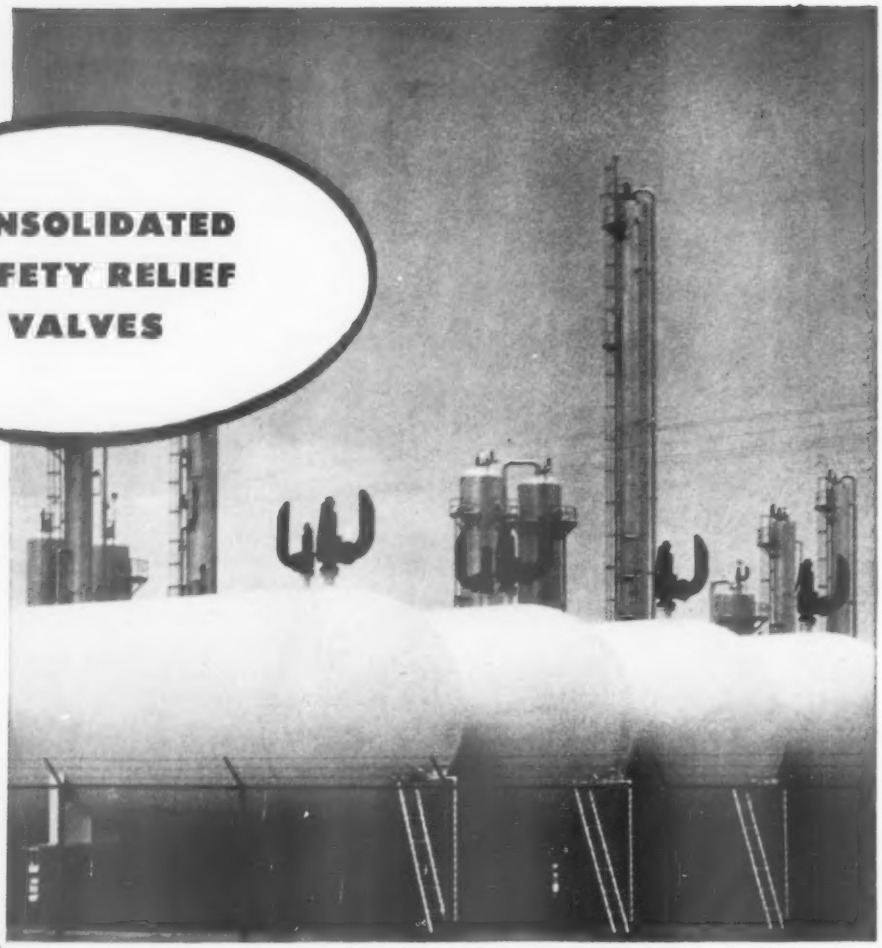
DO YOU HAVE YOUR COPY?

This complete bulletin tells the whole story about Catforming. Make sure you get your copy. Write The Atlantic Refining Company, Research and Development Department, P. O. Box 8138, Phila. 1, Pa. (Telephone HOward 5-2345.)

THAT COUNTS

ATLANTIC

CONSOLIDATED SAFETY RELIEF VALVES



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ABSOLUTE PROTECTION against overpressures is the one and only function of Consolidated Safety Relief Valves — and they give it. Proof of their unbeatable performance is evident in the many unfired pressure vessels — gas, vapor and liquid storage tanks, pipelines, pumps -- safeguarded by these valves throughout the processing industries.

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Invest in Consolidated Safety Relief Valves and you also get the fundamental advantage of **simple design** — high quality valves that serve better and longer because they have 25% fewer parts than ordinary safety valves.

Your local Consolidated Safety Relief Valve Industrial Distributor will explain how much this can mean to you in economical maintenance and simplified standardization. Phone or write him today. He is your best source for quick information and service.

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MAKERS OF 'CONSOLIDATED' SAFETY AND RELIEF VALVES, 'AMERICAN' INDUSTRIAL INSTRUMENTS, 'HANCOCK' VALVES, 'ASHCROFT' GAUGES. BUILDERS OF "SHAW-BOX" AND 'LOAD LIFTER' CRANES, 'BUDGIT' AND 'LOAD LIFTER' HOISTS AND OTHER LIFTING SPECIALTIES.

Producing at the

17,000

foot level

From the very early beginnings of the petroleum industry, when deep wells were rated in hundreds, rather than thousands of feet—National Supply has continually manufactured and supplied the proper equipment to keep pace with the ever-increasing needs of the oil country production frontiers.

As a result, this continuing research and development program by National Supply has made available such outstanding products as "Spang" tubular products, "Superior" and "Atlas" engines for powering rigs and pumping oil, a complete line of "Ideal" Rigs for drilling at every known depth, and famed "National" production machinery for every type of well.

Today, with exploratory wells producing pay from the 17,000 foot level—there are new frontiers for profitable recovery opening up in deep, practically unexplored geological strata. And, as in the past, National Supply's engineering and manufacturing "know-how" is producing the complete, integrated drilling and recovery equipment needed to reach these new recovery frontiers.

When rugged quality, efficient operation and proven field production are important factors affecting your choice in production or drilling equipment—there's only one choice: "National Blue."

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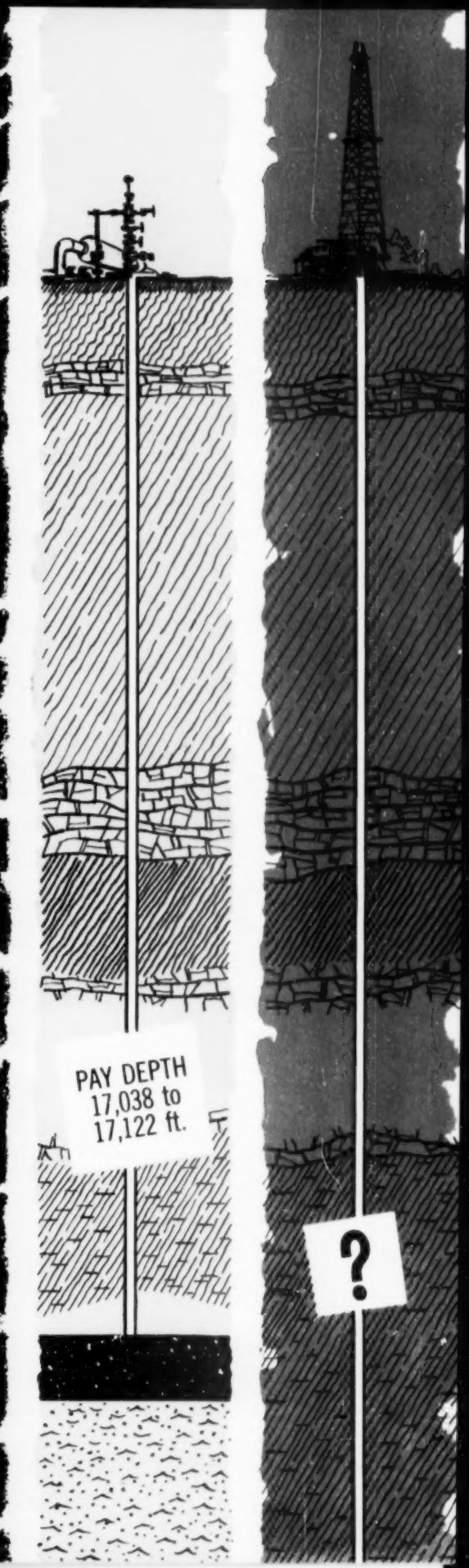

SPANG DOUBLE SEAL
SHRINK THREAD DRILL PIPE
& TOOL JOINTS
• Reduces failure and costly down-time
• Completely seals against internal and external pressures
• Joints rapidly replaced at the rig
SPANGSEAL TUBING
• Integral joint has only 2 threaded elements
• Streamlined contour eliminates "hanging-up"
• Metal-to-metal conical sealing surfaces at male and female thread ends provide maximum leakage resistance
• Reduced O.D. of joint for more hole clearance

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NATIONAL OIL FIELD MACHINERY AND EQUIPMENT • SPANG STEEL PIPE • SUPERIOR & ATLAS ENGINES

SPANGWELD DRILL PIPE
• Joints flash-welded to drill pipe
• Streamlined exterior contour
• Complete range of sizes for every drilling requirement
• ⅔ less threads—faster handling
• Lower initial cost
SPANG EXTREME LINE CASING
• High joint strength—positive fluid seals
• Maximum running efficiency, streamlined interior and exterior contours
• Minimum O.D. in joint
• Thread damage resistance
• Integral joints eliminate half of the threaded connections
SPANG GRADE P-110 EXTREME LINE CASING
• Greater collapse, bursting and tensile strength than grades J-55 and N-80
• Withstands highest tensile loading and most extreme pressures encountered
SPANG EXTREME LINE TUBING
• Wide threads for fast joint make-up; maximum running speed
• Metal seal for positive resistance to leakage
• 100% joint strength in all weights
• Integral joint reduces threaded connections by 50%
• Streamlined interior and exterior contours
• Positive shoulder contact engagement for proper make-up

the complete line of advanced tubular products from one source!

"SPANG" is a familiar and trusted name throughout the oil world. Such reputation stems from the performance of Spang tubular products through the decades.

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In the six tubular products in the SPANG line shown here, you'll find the outstanding construction features which are evidence of the craftsmanship and manufacturing quality behind the Spang trademark. Spang's association with the petroleum industry is your continuing guarantee of exceptional dependability and service.

New bulletins on Spang Tubular Products contain more valuable information you'll want for your reference files. Write now for your copies, or ask for them at your nearby National Supply Store.

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Precision-built for better balance, Ideal Kellys and Collars are completely integrated units of Ideal's complete line of drilling equipment and Spang Tubular products. In hundreds of drilling jobs, Ideal Kellys and Collars promote maximum penetration rates at all drilling speeds.

Ideal Kellys, in both square and hexagonal types, are precision manufactured of alloy steel and accurately bored for true concentricity—available in all standard API joint sizes. In use, they provide smoother "feed-off" and accurate balance for longer life and trouble-free operation.

Ideal Collars are built to withstand tremendous stresses on joint connections. Tempered for high strength—accurately bored and precision threaded, Ideal Collars have built an oil country reputation for extreme durability and long-range economy.

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NATIONAL OIL FIELD MACHINERY AND EQUIPMENT • SPANG STEEL PIPE • SUPERIOR & ATLAS ENGINES

They Say—

New England vs. Oil States

"There is a faint aroma of sectional politics in the House committee investigation of oil-price increases. The grilling of Hines Baker, president of Humble Oil & Refining Co., so ill-natured that Democratic members protested the discourtesy, came from representative of Massachusetts and New Jersey. Petroleum resources of the Southwest and neighboring oil-bearing sections, combined with other attractions, have taken such industry away from the East, especially New England. Massachusetts has been probably the heaviest loser, and New Englanders have missed few opportunities to blow poison darts at the areas that have cut into their prosperity.

"Representatives Heselton of Massachusetts and Wolverton of New Jersey, the moving spirits of the oil-price investigation and chief inquisitors of Baker, probably figure that this hazing is sweet propaganda for their constituents, and have let their spleen be unconfined. . . .

"Needless to say, neither of the down-East quizmasters has asked for an investigation or curbs of prices of products of their own states, some of which have risen more than prices of petroleum and its products since 1947, the year of the last oil-price increase."

From an editorial in the Houston Post.

Canada Wants Foreign Investors

"Because people in Britain and Europe and the United States have invested their money and their skills in Canada, we have a high standard of living in Canada. And that has made possible a high standard of saving. That high standard of saving has meant we have now come to the stage where we can finance the largest portion of our capital expansion ourselves, as well as invest money profitably abroad.

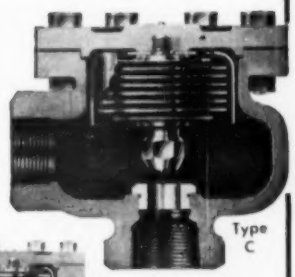
"I do not believe that government should go around trying to coax investment into the country, offering foreign investors some sort of special bait to attract an investment that otherwise would be uneconomical. Nor do I believe that foreign investors should be discriminated against. But I do believe that government can at least help create a climate that will encourage money and skill to go where it most profitably can go. To this end the Canadian Government has attempted to devise sensible taxation provisions which do

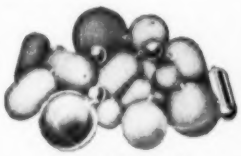
LEADING PROCESSOR

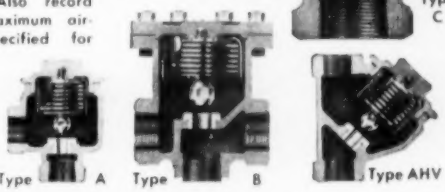
SHORTENS OPERATION from 65 to 45 Min.

with Nicholson Steam Traps

Records of a recent installation of Nicholson steam traps, by a large processor, show they cut heating cycles 30%; e.g., one operation was shortened from 65 to 45 min. Nicholson units keep equipment full of live steam because: 1) they operate on lowest temperature differential; 2) have 2 to 6 times average drainage capacity. Also record low for steam waste; and maximum air-venting capacity. Widely specified for preventing damage to thin gauges; eliminate cold blow in unit heaters.







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HIGH-PRESSURE FLOATS—Stainless, monel, steel or plated steel. Welded. In all sizes and shapes; for operating mechanisms and as tanks or vessels. **BULLETIN 753.**

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TRAPS · VALVES · FLOATS

LIFTS DIRT FROM FLOORS... HOLDS IT OFF...

CINDET

100% ACTIVE — 100% SAFE!

NEW LIQUID SYNTHETIC DETERGENT

Whether your water supply is HARD or SOFT, cleaning with CINDET means *no curds, no dingy film!* CINDET is *surface-active* — it works on the principle of LIFTING floor dirt, grease and old water-emulsion wax from floors and HOLDING it in suspension in a fluffy mass of energetically-cleaning SUDS. *Dirt is not re-deposited* — rinses off easily.

Dilute a little CINDET in HARD or SOFT water . . . apply with clean mop . . . let foamy, clean-looking suds stand 5 or 10 minutes . . . scrub only if necessary, and rinse thoroughly. The result: AMAZINGLY BRIGHT, CLEAN FLOORING.

Safe for *all* flooring — and wonderful for removing stubborn rubber marks. Also excellent for walls, for shampooing rugs and upholstery, for washing dishes by hand.

DOLGE backs up CINDET with a complete-satisfaction-or-deal-is-off GUARANTEE! Write for literature; have your DOLGE SERVICE MAN demonstrate CINDET on *your dirtiest, greasiest flooring.*

...THE SUDS DO THE WORK!

FREE SANITARY SURVEY OF YOUR PREMISES SEE YOUR DOLGE SERVICE MAN

dependable DOLGE

WESTPORT, CONNECTICUT

MIDWEST PIPING

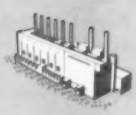
is shop-fabricated piping that

saves manpower

The installation of Midwest Piping requires the minimum number of man hours because the difficult operations have been performed in the fabricating plants so that field erection time is reduced to a minimum. This makes possible earlier operation of the plant. Another reason for this time saving is that every subassembly is carefully checked before shipment to make sure it is dimensionally correct and accurate in alignment. The difficulty often encountered in securing skilled mechanics for field work makes this advantage of Midwest Shop-Fabricated Piping now more important than ever before.

From A Simple Bend

Or Welded Assembly

To Complete Piping Systems For Power Plant 

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MIDWEST PIPING SERVICE IS NATION-WIDE

4 Plants Are Better Than 1

PIPING FABRICATORS AND CONTRACTORS

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not discriminate against the foreign investor. And I believe the general stability of Canadian Government is an important factor when the investor abroad is deciding whether or not to build a plant in Canada or to invest money in Canadian enterprise."

Douglas C. Abbott, Minister of Finance of the Canadian Government, in an address at the opening ceremonies of the Sarnia, Alta., plant of Cabot Carbon of Canada, Ltd.

Inventories Misinterpreted

"As everyone knows water will emerge from a pipe line or a garden hose only after the line or hose is filled from one end to another. Similarly, the refining, pipe line, transportation, and other facilities of the petroleum industry must be kept filled and moving if gasoline, home heating oil, and other products are to be available when and where they are needed.

"The amounts required by the industry to keep these facilities in full operation add up to startling figures. They represent an extremely highly percentage of the total amount of so-called inventories as reported by the Bureau of Mines. They are considered 'unavailable' to meet demand, because they must be kept 'on the shelf' permanently.

"Actually, in the petroleum industry, only 35 per cent of its crude oil inventories is available for processing, or merchandising. Similarly, there is available only 60 per cent of its light products (gasoline, kerosine, and distillate fuels, including home heating oils), and only 58 per cent of its heavy fuel oils. Saying this in reverse means that 65 per cent of its crude-oil inventories, 40 per cent of its light products, and 42 per cent of its residual fuel oil are unavailable for sale—continuously, as things stand today."

A statement by Frank M. Porter, president of the American Petroleum Institute, New York.

How to Up Natural-Gas Output

"Due to a fundamental error of policy of the Federal Power Commission, practically all exploration for and discovery of gas is conducted by the oil industry as an incident to the finding of oil, and the natural-gas industry has been wholly dependent upon the oil industry for the continuity of its very life blood.

"The policy of the commission, adopted in its first rate case, that a pipe line would be allowed to make on its production activities only a 6 per cent return on its depreciated investment had the immediate effect of penalizing the companies who had been

an ACCO product
R-P&C
No. 531-P
Bronze Globe Valve
Full Plug
1. Cross-bar, malleable iron handle and identification plate
2. High tensile, high torque rolled bronze stem
3. Heavy, deep packing nut
4. Even-pressure gland
5. Large, deep stuffing box can be repacked under pressure
6. High-test bronze bonnet with smoothly machined bevel for perfect seal with bevel of body
7. Heavy, rugged bronze union ring won't distort body or weaken threads
8. Stainless steel, heat-treated disc and seat ring. Full plug type. Machined as matched pairs for perfect fit and positive shut-off. Easy to replace
9. Heavy section, high-test bronze body with rugged reinforcing ribs
P&C Co.
350
WHY
Your Money
Buys More in
R-P&C Bronze Valves

• Every part of every bronze valve is made right in the R-P&C plant. From the designing of the pattern, the pouring of the molten bronze, the machining, polishing, fitting, inspecting, and testing . . . every operation is under the watchful eye of R-P&C Valve craftsmen.

They like to make valves, good valves, and they build into the complete line of R-P&C valves the quality that gives you more for your money. Specify R-P&C Valves on your next order.

Write our Reading, Pennsylvania office for literature on the types of valves you use

ACCO

R-P&C VALVE DIVISION
AMERICAN CHAIN & CABLE

Reading, Pa., Atlanta, Baltimore, Boston, Chicago, Denver, Detroit, Houston, New York, Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

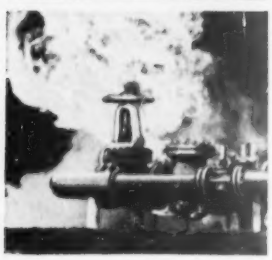
TRADE MARK

R-P&C valves

Pyrene
REG. U.S. PAT. OFF.

AIR FOAM EQUIPMENT

has put out more major oil fires than any other air foam equipment



THROUGHOUT the world Pyrene* Air Foam Equipment stands watch over oil fire hazards. It has long been regarded as *the* equipment for oil field and tank farm protection. Wherever you are—whatever your hazard—Pyrene is prepared to precisely meet your requirements. You can count on Pyrene to provide you with the *right* built-in air foam system or portable equipment. For complete information, or the help of a Pyrene engineer, write us today.

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Pyrene AIR FOAM

PYRENE MANUFACTURING COMPANY
579 Belmont Avenue, Newark 8, New Jersey
Affiliated with C-O-Two Fire Equipment Co.
The Pyrene Company Limited, England
Pyrene Manufacturing Co. of Canada, Limited

prudent enough to acquire reserves, and discouraged the acquisition of reserves by all pipe-line companies in the future.

"The only way you can really stimulate production by pipe lines is by rewarding exploration and discovery. . . . In my judgment, the ideal position for the operation of a pipe line is for it to own approximately 50 per cent of its reserves and purchase approximately 50 per cent of its requirements. In this manner it can always be in the best position to render full service to its consuming public."

Paul Kayser, president of El Paso Natural Gas Co., addressing a meeting of the Investment Bankers Association of America, White Sulphur Springs, W. Va.

CALENDAR

AUGUST

17-19 Society of Automotive Engineers, international West Coast meeting, Georgia Hotel, Vancouver, B. C., Canada.

18-21 American Institute of Electrical Engineers, Vancouver Hotel, Vancouver, B. C.

24-26 Appalachian Gas Measurement Short Course, West Virginia University, Morgantown, W. Va.

Aug. 31-Sept. 1 Interstate Oil Compact Commission, Northern Hotel, Billings, Mont.

SEPTEMBER

6-11 American Chemical Society, national meeting, Conrad Hilton Hotel, Chicago.

9-11 Pacific Coast Gas Association, San Francisco.

11-12 Association of Desk and Derrick Clubs of North America, annual meeting, Cosmopolitan Hotel, Denver.

13-16 American Institute of Chemical Engineers, Fairmont and Mark Hopkins hotels, San Francisco.

15-16 American Petroleum Institute, executive committee, Greenbrier Hotel, White Sulphur Springs, W. Va.

16-18 National Petroleum Association, annual meeting, Hotel Traymore, Atlantic City, N. J.

21-22 Natural Gasoline Association of America, fractional analysis seminar, Texas Hotel, Fort Worth.

21-25 Instrument Society of America, national instrument conference and exhibit, Sherman and Morrison hotels, Chicago.

24-25 Western Petroleum Refiners Association, regional meeting, Henning Hotel, Casper, Wyo.

27-30 American Society of Mechanical Engineers, annual conference, petroleum division, Rice Hotel, Houston.

Sept. 27-Oct. 2 American Society for Testing Materials, Committee D-2 on petroleum products and lubricants, Shoreham Hotel, Washington, D. C.

28-29 Independent Natural Gas Association of America, Shamrock Hotel, Houston.

Sept. 30-Oct. 2. American Association of Petroleum

Geologists, Mid-Continent regional meeting, Masonic Building, Wichita.

Sept. 30-
Oct. 2 National Association of Corrosion Engineers, Permian Basin section, biannual field tour, Lincoln Hotel, Odessa, Tex.

OCTOBER

1- 2 Mid-Continent Oil and Gas Association, Louisiana-Arkansas division, annual meeting, Roosevelt Hotel, New Orleans.

4- 6 American Association of Oilwell Drilling Contractors, thirteenth annual meeting, Cosmopolitan Hotel, Denver.

5- 7 Petroleum Electric Power Association, silver anniversary meeting, Muehlbach Hotel, Kansas City.

6- 7 Texas Mid-Continent Oil and Gas Association Rice Hotel, Houston.

7- 9 National Association of Corrosion Engineers, south central region, Mayo Hotel, Tulsa.

8- 9 California Natural Gasoline Association, annual fall meeting, Ambassador Hotel, Los Angeles.

11-17 Oil Progress Week.

19-21 American Institute of Mining and Metallurgical Engineers, petroleum branch, fall meeting, Dallas.

19-20 Independent Petroleum Association of America, annual meeting, Texas Hotel, Fort Worth.

22-23 Western Petroleum Refiners Association, regional meeting, Garrett Hotel, El Dorado, Ark.

22-24 Gulf Coast Association of Geological Societies, third annual convention, Shreveport.

23 Natural Gasoline Association of America, regional meeting, Blackstone Hotel, Tyler, Tex.

26-29 American Gas Association, annual conference, Kiel Auditorium, St. Louis.

27 Association of Consulting Chemists and Chemical Engineers, Inc., annual meeting, Hotel Belmont Plaza, New York City.

29-31 Rocky Mountain Oil and Gas Association, annual convention, Cosmopolitan Hotel, Denver.

NOVEMBER

3- 4 Society of Automotive Engineers, national diesel-engine meeting, Conrad Hilton Hotel, Chicago.

5- 6 Society of Automotive Engineers, national fuels and lubricants meeting, Conrad Hilton Hotel, Chicago.

5- 6 American Association of Petroleum Geologists, Pacific section annual meeting, Hotel Biltmore, Los Angeles.

9-11 Geological Society of America, annual meeting, Royal York Hotel, Toronto, Ont.

9-12 American Petroleum Institute, annual meeting, Conrad Hilton Hotel and Palmer House, Chicago.

12-13 Society of Exploration Geophysicists, midwestern meeting, Adolphus Hotel, Dallas.

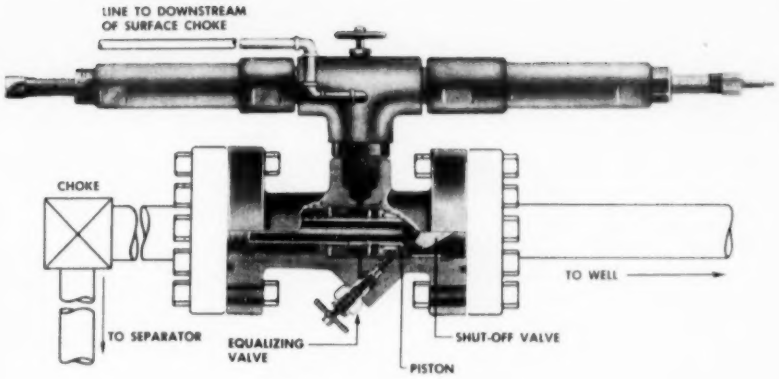
19-20 Annual Instrument Short Course, Los Angeles Harbor Junior College, applied technology division, Wilmington, Calif.

20 Natural Gasoline Association of America, regional meeting, Herring Hotel, Amarillo, Tex.

Nov. 29-
Dec. 2 American Society of Mechanical Engineers, Statler Hotel, New York City.

DECEMBER

13-16 American Institute of Chemical Engineers, annual meeting, Hotel Jefferson, St. Louis.



Larger sizes and higher working pressures in New Type C Otis Surface Safety Valves

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- *Working pressures to 15,000 p.s.i.*
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Type CAM-1	2"	2½"	3"	4"
Working pressure range, psi:	6-15,000	6-10,000	2-5,000	
Maximum pilot settings; from 50 psi to:	6-7,500	3-5,000	2-3-5,000	
Bore through valve:	⅝"-1"	1⅜"	1⅝"	2⅛"
Over-all length (± depending upon pilot settings):	38"	38"	38"	38"
Approximate weight, complete assembly*:	140#	160#	175#	198#

*—Data are for flange end models with Type M Pilot Fixture; screw end models, or valves without pilot fixture, also are available (see bulletins).

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THE OIL AND GAS
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JOURNALLY Speaking

Everest vs. Flagpoles

WE sometimes have difficulty understanding British humor (humour), and apparently the difficulty is mutual. We have just received a letter from a reader in Tretawn Gardens, England, chiding us for a recent reference to Mt. Everest. He writes:

"You seem puzzled over why we British climbed Everest—and now can brag about this feat. Choice of the word 'brag' seems rather unfortunate in view of repeated references in other issues to 'our favourite oil paper' etc., etc., but we'll let that one pass. We over here are in turn often puzzled by Americans' desire to climb 100-ft. poles and squat for days on end on their tops. So our bewilderment over each other's climbing habits is mutual.

"However, in case you would appreciate the British viewpoint being explained in regards to Everest, we think it was a fine thing to have done, not just because it hadn't been climbed before, but because the achievement meant a not inconsiderable display of human courage and guts, as well as scientific 'know-how'."

Without laboring (labouring) the point, we will state flatly that we harbor (harbour) no ill will. We were just trying (feebly) to contrast mountain climbing with deep drilling by pointing out that while the ultimate of one has been reached, the other still has an unlimited challenge. But if our correspondent is going to bring up such subjects as Americans' penchant for flag-pole sitting, marathon dancing, and be-bop jive, we had better drop the matter quickly. And certainly no one could fairly accuse the British of out-bragging Americans at any time.

It Ain't No Sin

THIS department apparently has another reader, for from California comes a comment on our recent remarks about confusion in terminology between chemicals made from petroleum and chemicals used in petroleum.

"What could be more appropriate," he asks, "as a name for that class of petrochemicals that are made from petroleum, than 'petrosynthetics'?"

That's a descriptive word, all right, but with Americans' proclivity to abbreviate, it doubtless would be shortened to "petrosyns." And then some evil-minded critic of the industry would spell the last syllable "sins," just as the leaders of the steel industry are snidely referred to as "steal barons." We'd better lay off it.

Bustle in Russell

THE town of Russell, Kans., can't wait for Oil Progress Week (October 11-17) so it's having its own celebration of "Three Decades of Derricks" September 10-12 to mark the thirtieth anniversary of the discovery of oil in western Kansas and the twentieth anniversary of the first acidizing of a well in the state. There'll be dancing in the streets and other forms of public celebration reminiscent of the excitement which accompanied those two events which virtually "made" the town of Russell. It shows that in some places, appreciation of the oil industry is not confined to just one week of the year.

Sound Advice

OUR favorite oil publication scores again!

A feature of the annual show put on by engineering students at the University of Oklahoma was a model of a sonic oil-well pump which uses ultrahigh-frequency sound waves to actuate the plunger. The model created a great deal of interest among visiting oil men, who had never seen anything like it in this part of the country.

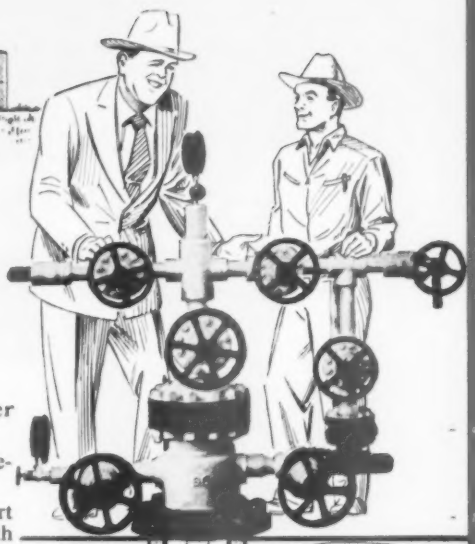
The students who built the model said they got all their information from an article in The Oil and Gas Journal describing experiments with a sonic pump on the West Coast. They followed the drawing and description, and their pump worked perfectly. How's that for proof of the Big Yellow Book's completeness and accuracy? It pays to read the Journal.

Henry D. Ralph

a well-side chat

about "permanent" installations of

BAKER RETAINER PRODUCTION PACKERS



(SETTING) *Melvin Matthews, Baker Branch Manager, chats with an operator in the Magnolia Field in Southern Arkansas, who has a number of wells ready to go on the pump.*

(TIME) *December, 1952.*

Operator: What experience have you had with Baker Packers in *this* field?

Matthews: Well, we just finished setting a Baker Packer in *this* well.

Operator: What do you mean? This well has been on production for ten years.

Matthews: You're right. A Baker Model "B" Packer was run in on tubing and set in December, 1942. At that time the well had a bottom-hole pressure of 3,750 psi.

Operator: You mean the packer has been in all that time and held up for ten years?

Matthews: That's right, for 10 years. You know Baker claims that their packers are for "permanent" installations, and I guess when a packer stands up for ten years with that differential across it that's "permanent" enough, and mighty good performance.

Operator: Sure sounds "permanent" enough for me. By the way, how many Baker Packers are in this field anyway?

Matthews: Well, I don't know exactly how many were set to start with, but there are 31 I can think of right off hand that were set in 1942 and are still operating perfectly.

Operator: Man, that's a lot of packers in one field like this. Will the new packer you just set in this well be good for another ten years?

Matthews: It will probably be good for 20 years, because it was the new "D-4" packer, and they should easily last twice as long.

Operator: What makes you think that?

Matthews: Well, there are a number of reasons. In the first place the packers set here in 1942 had the seal in the packer and it couldn't be repaired. With the new "D-4" the seals are on the Tubing Seal Nipple which is part of the tubing string, and when the seals need repairing you just pull the tubing, install new seals on the Baker Tubing Seal Nipple and run in again.

Operator: That sounds like a real improvement.

Matthews: Yes, it was, but that's just part of it. With wells getting deeper and both pressures and temperatures higher, the new Baker Packers have lead seals to back up the resilient packing element, and then we put in malleable iron rings to back up the lead seals. Our Engineering Department found that when things got really tough the resilient packing element wouldn't stand up by itself, and even the lead would give way sometimes under extreme conditions. So, we backed up the lead with malleable iron rings—and believe me, that did it.

Operator: Sounds like you *could* be right about that new packer lasting 20 years. But what about drilling out the packer if you have to go on the pump?

Matthews: No trouble at all. The new packer is just as drillable as the old type was, and operators around here know that *it* drills up easily because they've had to drill 'em when the wells finally quit and had to be put on the pump.

Operator: Well, I guess you're right about "permanent" installations. If a packer holds out until the well quits and you have to put her on the pump, that should be "permanent" enough to satisfy anybody.

•

The Baker Retainer Production Packer has so many other advantages besides being "permanent" that you ought to know all about it. You should know how it can be set on a wire line (as well as on tubing or drill pipe)—how it virtually becomes part of the casing, leaving the tubing free to be run or pulled as often as necessary—how you can produce two zones separately and simultaneously.

There's a new issue of Baker Equipment News on the subject of "Dual Zone Completion Practices" which is well worth your study. Ask any Baker representative or office for your copy.

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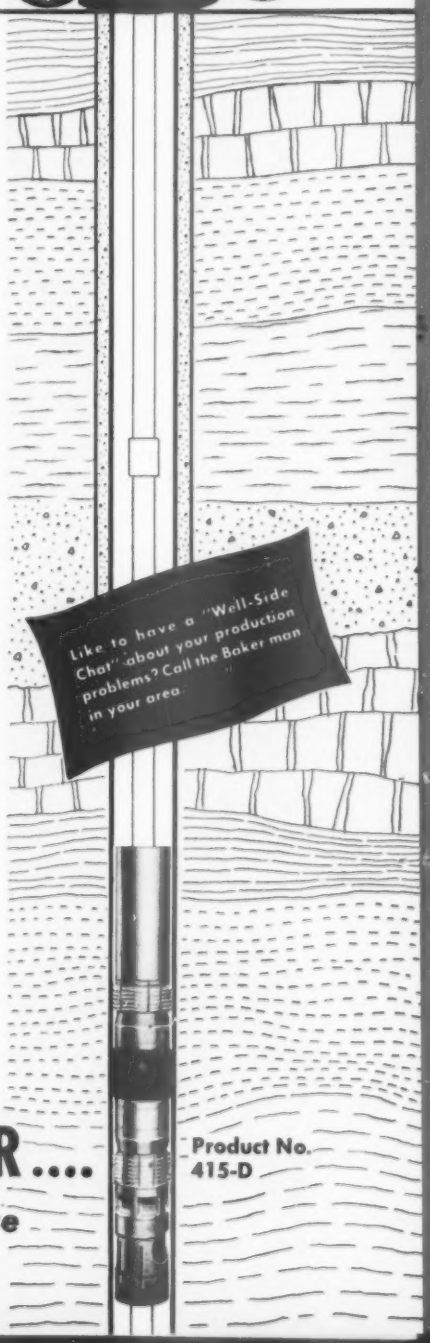

BAKER RETAINER PRODUCTION PACKER....

Product No. 415-D

Available through any Baker office or representative

What the Korean truce means to the oil industry

THE truce in Korea which was signed last week may, in retrospect, be seen as a turning point in the course of the oil industry, but at the moment its effect is chiefly to call for a reexamination of where the industry stands and where it is heading during the next few months.

There will be no appreciable decline in the military demand for petroleum products. After a few weeks military consumption may fall off slightly, but this should have no effect on the operations of the oil industry as a whole. Defense contracts and the recruiting and training of military personnel will continue about as presently scheduled.

Neither will there be any immediate impact on general business activity. The truce was so long in the making that its effects have been rather generally discounted. And business has adjusted to the leveling off of defense spending which has been under way for several months.

WHAT the oil industry must watch is the change in national policy and national psychology which may result from the end of the shooting. There is no question but that business activity and consumer spending have been buoyed up by the defense program and fear of World War III. Will there be a slump which will seriously curtail the market for oil? Most economists think not, but the industry should watch the signs closely and be ready to make any necessary adjustments.

If, as is hoped, the Korean quiet foreshadows several years of world peace and lessened international tensions, it will lead to some fundamental changes in national policy. With less emphasis on defense the Government may no longer ask the industry to maintain a standby reserve capacity. Or it may be less concerned about a petroleum supply within our own borders.

IN international relations there undoubtedly will be more emphasis on "trade, not aid", which is another way of saying that this nation should import more and export less. For oil, there is a question whether the stimulation to world commerce which this policy promises will offset the effects of heavy imports.

Some reduction in federal taxation is due if the armistice means what we all hope. How will this affect investment in petroleum facilities and demand for petroleum products? This is just a sample of the long-range questions posed by the potential transition from cold war to cold peace.

The point is that the course of oil, down to the job of the roughneck on a rig, depends in great measure on decisions that are going to be made in Washington. It is these forthcoming national policies, rather than any immediate change in the demand for oil, that will determine the effect of the Korean truce on the petroleum industry.

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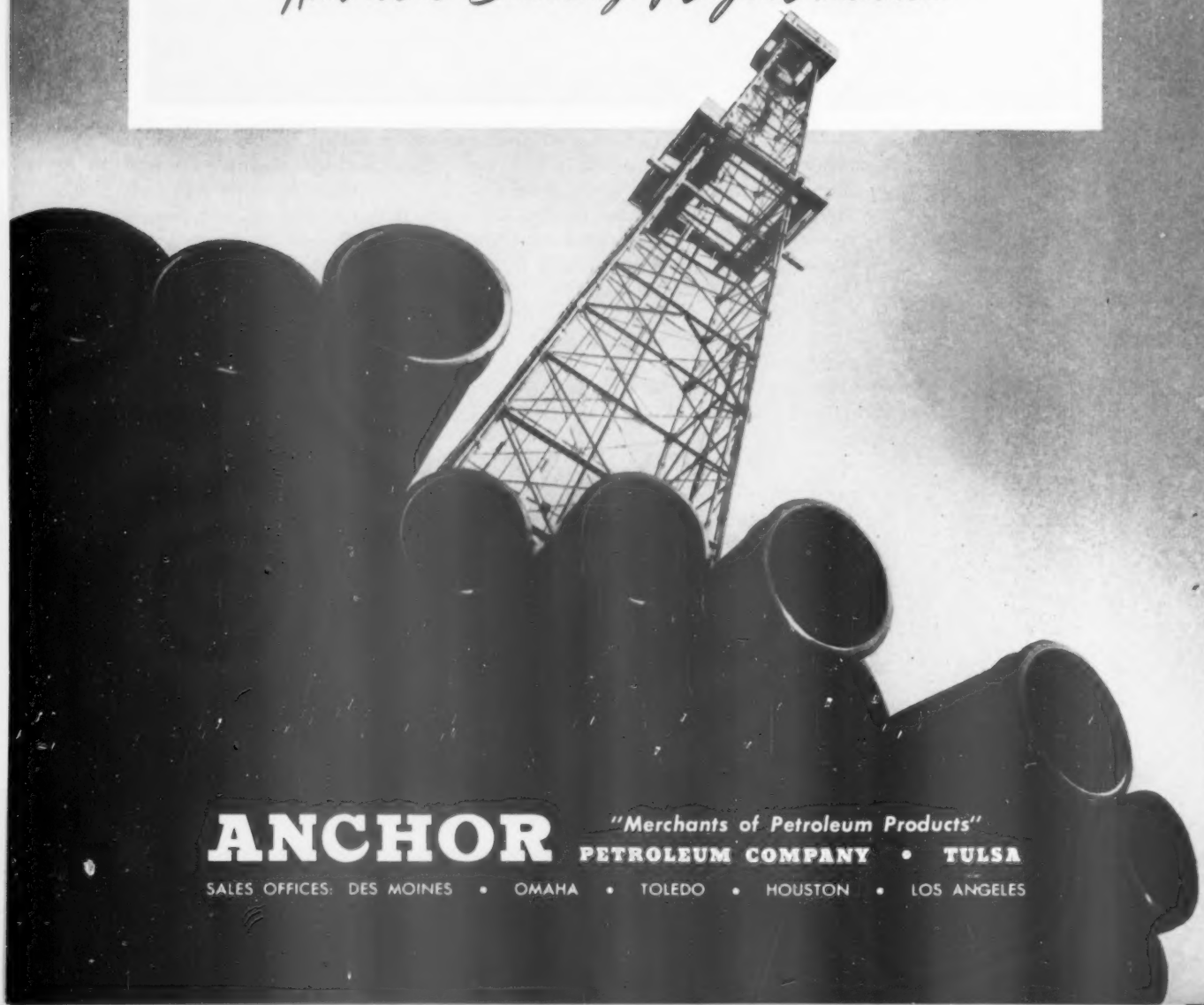
And we're Shooting for Your Business



ANCHOR *"Merchants of Petroleum Products"*
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THIS WEEK

LAUNCHING of the deepest pipe-line water crossing ever attempted will take place from this site August 6 near St. Ignace, Mich., on the north shore of the Straits of Mackinac. The 21,000-ft. crossing, at depths below 230 ft., will cost Lakehead Pipe Line Co. roughly $8,000,000—more than 10 per cent of the investment required for the company to lay its entire 644-mile, 30-in. crude line from Superior, Wis., to Sarnia, Ont. Just to the right of the launching strip lie the dollies and pontoons which will be used to pull the pipe across the straits.

GOVERNMENT.—Simpson bill providing for limitations on imports of crude and products is killed by 242 to 161 vote in the House. . . . No further effort to restrict imports expected during this session. . . . ¶Senate and House conferees reach agreement on bill providing for federal administration of submerged lands beyond state boundaries. . . . Senate-backed amendment earmarking revenue for aid to education is discarded. . . . ¶Senate rejects compromise proposal on sale of the Government's synthetic-rubber plants. . . . Action of the upper house dims hope that bill may become law this year. . . .

PIPE LINES.—First of two 21,000-ft. lines to be pulled across the Straits of Mackinac this week on big Lakehead Pipe Line project in what is heralded as the deepest underwater crossing operation ever tackled. . . . Venture involves laying 20-in. under the straits between St. Ignace and Mackinaw City, Mich., at depths below 230 ft. . . . ¶Construction begins on all sections of the new Standard Oil Co. (Ind.) 238-mile, 10 and 12-in. products line from Whiting, Ind., to River Rouge, Mich. . . . ¶Pioneer Pipe Line Co. to dedicate recently completed 8-in. products line from Sinclair, Wyo., to Salt Lake City in ceremony at Salt Lake August 10. . . .

REFINING.—Journal survey shows Philadelphia will pass Los Angeles later this year as nation's second-largest refining center. . . . Total crude capacity in Philadelphia area will reach 770,000 bbl. daily by end of the year as a result of new construction under way at most of the seven nearby refineries. . . . ¶Pan American Refining lets contract for erection of a 21,000-bbl. cat reforming unit at its Texas City, Tex., plant. . . . ¶Danaho Refining Co. reveals plans to more than double crude capacity of its Pettus, Tex., refinery. . . . ¶General Petroleum Corp. building new 15,000-bbl., $9,000,000 cat reformer at Torrance refinery in California. . . .

INTERNATIONAL.—Price increases for Middle East crude stabilized at 22 cents a barrel in Persian Gulf area, 10 cents in eastern Mediterranean. . . . ¶Esso places new 10,000-bbl. cat cracking unit on stream at Port Jerome refinery. . . . Other construction to increase refinery's capacity to 84,000 bbl. daily next year, according to O.E.E.C. . . . ¶Anglo-Iranian pushes expansion program at 80,000-bbl. refinery in Llandarcy, Wales. . . . New furfural and gas-oil treating units now on stream. . . . Propane deasphalting and MEK dewaxing units nearing completion. . . . ¶Group representing Cities Service and Richfield completes preliminary geological reconnaissance in Province of Dhofar, southern Arabia, with view to possible future oil exploration. . . .

TRENDS.—Total demand for crude and products, indicated by current figures for 4-week period ended July 25, averaged about 7,540,000 bbl. daily, up 6.7 per cent from the average for July 1952. . . . Final figures may credit part of the gain to June since the highest demand in the 4-week period was for week ended July 4. . . .

ACTIVITY.—Production of crude and lease condensate averaged 6,539,375 bbl. daily for week ended July 25, up 12,750 bbl. daily. . . . ¶Total well completions for the week increased 144 wells to 1,045 and a new all-time record. . . . ¶Wildcat completions gained 38 wells to 248. . . . ¶Rotary rigs operating in United States on July 27 totaled 2,591 to drop below 2,600 for the first time in 8 weeks. . . .

DREDGES work feverishly to make way for the pulling this week of the first 21,000-ft., 20-in. line across the Straits of Mackinac. Launching sites for Lakehead's two underwater crossings, 1,300 ft. apart, are seen in background near St. Ignace, Mich., on the north side of the straits between Lake Huron and Lake Michigan.

Deepest Crossing Set

First of two 21,000-ft. lines across Straits of Mackinac to be pulled this week on big Lakehead Pipe Line project

Paul Reed

ST. IGNACE, Mich. — Operations will be kicked off near here this week on the deepest and one of the most costly underwater pipe-line crossings ever attempted—Lakehead Pipe Line Co.'s crossing of the Straits of Mackinac.

The venture will involve laying two 20-in. lines under the straits at depths below 230 ft. The first of these will be pulled across August 6, the other, 1,300 ft. from the first, on September 10.

The 21,000-ft. crossing at the stormy capes between Lake Huron and Lake Michigan is a vital part of the construction of Lakehead's 644-mile, 30-in. crude-oil line from Superior, Wis., to Sarnia, Ont. Work is being pushed in order that Alberta oil coming through the Interprovincial Pipe Line Co. and Lakehead systems via Superior may be delivered at Sarnia this winter.

Possible cost of the Mackinac crossing has been estimated as high as $8,000,000, which would be more than 10 per cent of Lakehead's investment of $75,000,000 required to lay the entire line from the upper end of Lake Superior across the upper and lower peninsulas of Michigan to Sarnia.

World's longest system . . . The Lakehead project is the longest crude-oil line now being built, and it is the first crude-oil line in the United States with diameter as large as 30-in. When finished it will lengthen the combined Interprovincial and Lakehead lines to a total of 1,765 miles, making the system the longest continuous crude-oil main line in the world.

Lakehead is the American subsidiary of Interprovincial Pipe Line Co., a Canadian firm.

By insuring steady year-round deliveries, the new line will remove the bottleneck at Superior, Wis., resulting from the 5-month winter interruptions in Superior-Sarnia tanker movements. Alberta crude will be delivered more economically to the Great Lakes industrial area. The project is regarded as a vital defense measure for North America.

The initial pump station at Superior will have capacity of 120,000 bbl. daily for pumping the entire 644 miles to Sarnia. By later addition of five more stations ultimate capacity will be 300,000 bbl. daily. The 2,800,000 bbl. required to fill the line will have a value of more than $6,000,000. Difference in elevation between Superior and Sarnia is only 30 ft.

Pipe laying is being rushed in the short construction season between June 1 and October 1, by seven main-line spreads and personnel at three major water-crossing sites.

This article was prepared after the author visited crossing sites at the Mackinac Straits and the St. Clair River and overland pipe-laying operations.

Mackinac crossing . . . The crossing of the Mackinac Straits between St. Ignace and Mackinaw City, Mich., will be the most spectacular job carried out by pipe-line industry this summer.

Bechtel Corp., handling engineering and management of the entire Superior-Sarnia project as agent for Lakehead, and Merritt, Chapman & Scott Corp., contractor, have laid their plans so as to be prepared for all conceivable dangers.

New techniques and equipment will be applied in pulling the two lines across the strait. Pipe is being welded and coated in 2,500-ft. sections on the north shore near St. Ignace by Midwestern Constructors, Inc., subcontractor for Merritt, Chapman & Scott.

Launching pontoon and buoy equipment has been rented from Collins Construction Co. Pontoons strapped to

DIRECTING CONSTRUCTION of big Lakehead project are (from left) R. L. Hamilton, pipe-line consultant, and Clark Rankin, project manager, both of Bechtel Corp.; R. E. Trammell, vice president and general manager, and Roger Clute, chief engineer, both of Interprovincial Pipe Line Co. and Lakehead Pipe Line Co.

BIG LAKEHEAD LINE, extending 644 miles from a connection with the Interprovincial-Lakehead system at Superior, Wis., to Sarnia, Ont., will provide year-around crude delivery.

the pipe at 80-ft. intervals will insure a negative buoyancy of only 6 lb. per lineal foot, thus facilitating dragging the pipe along the bottom.

A winch located on the south shore in the vicinity of Mackinaw City will pull the sections across the strait using a 2-in. cable. Tension will be maintained with a winch and cable on the opposite or north shore. During tie-in welding of the 2,500-ft. sections, the submerged pipe will be held by special snubbing equipment near the shore.

Pipe will be supported on the rubber tires of special small launching equipment as it slides down the land slope to the water. It will be protected at the shore from sudden plunging which might buckle it through the use of two stabilizing or teetering devices known as "Monkey Motions." One will be on shore, the other on a nearby barge.

Instrument checks . . . Tension on the pipe will be watched at dynamometers. The position of the pipe in the water during pulling will be determined by fathometers.

If there should be difficulty in locating the leading end of the pipe, a diver might be sent down to attach a light, which could be observed at the surface. Consideration has even been given to the possibility of utilizing special submarine television equipment which can "see" farther than a diver under water. The deep part of the crossing is too deep for a diver to remain more than a short time.

Operations will be directed by direct-wire telephone and standby radio from a control station on shore which will communicate with observation towers built in the water along the pipe-line route as well as with floating equipment and winches. Position of the pipe will be checked in relation to spar buoys placed at intervals.

Dredging is being done to provide for trenches for the lines to depths of 65 ft. Beyond in deep water the pipe will lie on the bottom.

Water-crossing methods for this project will be described in detail in an article to appear in the Engineering and Operating Section in a later issue of The Oil and Gas Journal.

St. Clair crossing . . . Pipe was pulled across the St. Clair River between Port Huron, Mich., and Sarnia, Ont., in another complicated crossing on July 22.

Here a single 2,400-ft., 30-in., concrete-jacketed section of pipe was pulled across the bottom of the river in 1 day from the Canadian to the United States shore. There were no interruptions in the operation for tie-in welding.

Because of the deep channel and steep banks, this crossing involved digging shafts for coffer dams required in constructing large concrete pipe and tunnel entrances at both shores. The pipe entered these openings at depths of approximately 14 ft. below the surface. At the deepest part of the river the pipe is about 60 ft. below the surface of the water.

The pipe was pulled across the river with two cables—one drawn by a winch on land, the other by a winch on a barge near the American shore. During launching the pipe was supported on B-26 airplane landing-wheel tires installed in special dollies.

Planning for the crossing was such that interruption of movement of ships on the St. Clair was avoided. This river has the heaviest water-borne traffic in the world.

Construction problems . . . The term "wettest inch" could be applied to the current Lakehead project both because of amount of time lost on the Upper Peninsula due to frequent rain and by the problems encountered in "Little Holland" between Bay City and Port Huron on the Lower Peninsula where the water table is high and where many deep drainage canals must be crossed.

Further north a large part of the line traverses Michigan's "Vacation Land" where heavy tourist traffic also hampered operations.

By July 10 the seven spreads had welded 122,868 ft. of line. Fastest

THIS SHAFT served as a coffer dam in connection with the building of a tunnel which was used during the recent successful pulling of a 2,400-ft., 30-in. line across the St. Clair River near the Sarnia, Ont., terminus.

time was made July 9 by Spread No. 5 of Bechtel Corp., based at Gaylord with an output of 9,500 ft. Double and triple jointing of pipe was feasible in that area because of local highway conditions. As a consequence the output of the spread was increased considerably.

Conyes Construction Co. welded 7,020 ft. on the same day with three stringer bead welders and four hot pass welders working simultaneously in the pipe gang, handling 40-ft. joints.

Construction setup . . . Engineering and management of the Superior-Sarnia project is being handled by Bechtel Corp. as agent for Lakehead under the direction of Van W. Rosendahl, senior vice president and Clark Rankin, project manager, who supervised construction of Iraq Petroleum Co.'s Kirkuk-Bania 30-32-in. line in the last 2 years for Arabian Bechtel Corp.

John B. Chambers is administration manager. H. D. Barker is project engineer, and Clark Root is assistant project engineer for Bechtel. J. Don Creveling is manager of lands department.

Bechtel's construction department is split into two divisions: The Superior pump station, Spreads 1, 2, 3, and 4, and the Mackinac Straits crossing are under construction manager, E. F. Quiett, with headquarters at Iron Mountain, Mich. Spreads 5, 6, and 7, plus the Saginaw River, St. Clair River crossing and the Canadian work are under A. M. Berlander, construction manager with headquarters in Bay City, Mich.

Coordinating committee . . . The Lakehead undertaking is directed by a coordinating committee headed by R. E. Trammell, vice president and general manager of Interprovincial and Lakehead. Other members are: F. J. Stubbs, assistant general manager, and Roger Clute, chief engineer, both of Interprovincial and Lakehead; Van W. Rosendahl, senior vice president; and R. L. Hamilton, pipe-line consultant, both of Bechtel Corp.

Operations of Merritt, Chapman & Scott are conducted under the direction of Sherman H. Serre, vice president in charge of the Great Lakes area. On the job Joseph S. Troxell is project manager, John I. Tooker, superintendent of pipe pulling, Donald McGregor, superintendent of dredging, R. C. Candler, superintendent of tugs and equipment, Pat Ryan and James Surtenant, project engineers. Bechtel Corp. is represented at the straits by V. R. Stirling, Tom Geiger, and John Long.

Comstock Midwestern, Ltd., operations at the St. Clair River crossing are directed by Carl Stanley, superintendent. Clyde A. Farris is Bechtel's supervisor there.

The main-line pipe-laying contractors are: Mahoney Contracting Co., Anderson Brothers Corp. (two spreads), Midwestern Constructors, Inc., Bechtel Corp., and Conyes Construction Co. (two spreads).

W. J. Meagher & Sons, Inc., has the Saginaw River crossing. Walco Engineering & Construction Co. is building the pump station at Superior.

TEL Content Hiked

Volume per gallon of gasoline on July 1 up more than 10 per cent over April 1; octane numbers remained unchanged

OCTANE numbers of both premium and regular gasolines at the first of July were unchanged from April but the volume of tetraethyl lead per gallon of gasoline increased more than 10 per cent, according to data released in the latest quarterly survey of the petroleum chemicals division of E. I. du Pont de Nemours & Co., Inc.

The unweighted average of reports

Comparison of Motor-Gasoline Surveys

(Octane numbers are by research method, arithmetic averages by cities)

	Premium				Regular			
	Octane number			TEL cont. cc./gal.	Octane number			TEL cont. cc./gal.
	July 1952	April 1953	July 1953	July 1953	July 1952	April 1953	July 1953	July 1953
Aberdeen	88.9	89.7	89.4	2.06	81.4	83.6	83.4	1.62
Amarillo	88.8	89.5	88.6	2.29	81.1	81.8	81.1	2.48
Atlanta	91.9	92.5	92.6	2.26	84.7	85.4	85.8	2.73
Bakersfield	89.3	89.6	89.1	2.86	81.0	80.8	80.7	1.82
Baltimore	92.7	93.2	93.0	2.62	87.0	88.0	87.6	2.23
Boston	92.4	92.9	92.4	2.26	87.1	87.8	87.7	2.28
Calgary	87.0	86.9	87.9	2.78	81.6	81.5	82.4	2.31
Casper	89.0	89.6	89.1	1.77	81.7	81.8	81.8	1.34
Charlotte	92.0	92.4	92.1	2.31	84.9	85.5	85.8	2.36
Chicago	90.0	90.2	90.1	2.38	82.5	83.7	84.1	2.24
Cincinnati	91.5	92.1	92.0	2.76	86.3	87.0	86.6	2.54
Cleveland	91.6	92.4	92.4	2.65	87.1	87.3	87.7	2.23
Columbus	91.6	92.6	92.1	2.76	86.4	87.6	87.5	2.38
Corpus Christi	90.9	92.1	91.9	2.61	83.2	85.1	84.7	2.56
Dallas-Fort Worth	91.5	92.5	92.1	2.67	82.9	85.2	84.3	2.55
Denver	88.4	89.4	89.1	1.69	80.5	81.1	80.8	1.55
Detroit	91.5	92.5	92.5	2.71	85.9	86.8	86.6	2.47
Edmonton		87.8	88.6	1.76		82.3	82.9	1.12
El Paso	85.5	90.3	89.3	2.92	76.7	81.0	80.4	2.65
Great Falls-Billings	90.3	91.0	91.0	1.99	81.8	83.5	83.2	1.56
Houston	91.7	92.3	92.2	2.61	84.2	85.9	85.8	2.60
Indianapolis	89.8	90.4	90.6	2.54	83.6	84.6	84.3	2.36
Jacksonville	91.3	92.6	92.1	2.05	85.2	85.9	86.3	2.30
Kansas City	89.2	89.8	90.0	2.36	82.1	83.9	83.5	2.04
Little Rock	90.2	91.6	92.0	2.66	83.2	85.5	85.2	2.32
Los Angeles	90.5	90.7	91.0	2.32	82.0	82.2	82.6	1.96
Louisville	91.0	92.0	91.8	2.71	84.9	85.3	85.5	2.54
Memphis	90.9	91.2	91.5	2.70	83.7	85.2	84.6	2.63
Milwaukee	91.1	91.4	93.5	2.71	83.3	83.7	84.4	1.96
Minneapolis	89.3	89.9	89.9	2.45	82.2	83.4	83.7	1.88
Montreal	90.4	90.6	91.1	2.06	85.5	86.0	87.3	1.64
Nashville	90.6	91.6	91.8	2.58	84.1	85.9	84.8	2.61
New Orleans	90.6	91.5	92.3	2.78	84.5	85.6	85.4	2.42
New York (met. area)	92.4	92.4	92.4	2.34	86.5	87.3	87.6	2.07
Omaha	89.3	89.5	89.7	2.21	81.9	82.9	83.1	1.90
Philadelphia	92.1	92.8	92.7	2.34	87.0	87.7	87.7	2.41
Pittsburgh	91.7	92.5	92.3	2.36	86.6	87.3	87.6	2.18
St. Louis	89.7	90.2	90.0	2.35	82.8	83.5	83.3	2.17
Salt Lake City	88.6	88.6	88.5	1.97	79.3	80.6	80.3	1.46
San Francisco	90.9	91.3	90.9	2.29	81.9	82.2	82.2	2.00
Seattle	91.0	91.0	90.6	2.39	81.8	82.6	82.1	2.18
Shreveport	90.5	92.1	91.9	2.64	83.9	85.0	84.6	2.39
Spokane	90.4	90.7	90.3	1.98	82.0	82.1	82.2	1.63
Toronto	90.0	90.6	91.0	1.90	85.6	86.0	86.6	1.63
Tulsa	89.2	90.0	90.5	2.51	81.5	83.0	83.2	2.02
Vancouver	89.0	89.9	90.3	2.78	83.6	83.1	82.6	2.28
Wichita	88.0	89.8	90.6	2.44	81.8	83.1	83.1	1.82
Winnipeg	89.2	88.7	90.1	1.37	84.9	84.2	84.8	1.21

for 47 cities shows a research octane number for premium gasoline of 91.0, unchanged from the April survey but up from the average of 90.3 for July of last year.

The average regular gasoline had an octane number of 84.4 on the July survey, also unchanged from April. Regular grades averaged 83.5 a year ago.

Departure from norm . . . Greater use of TEL during some of the summer months is normal but most of the surveys in recent years have shown slight increases in average octane numbers from April to July along with increases in use of TEL. At the time of the April survey, some service stations are still marketing gasolines with relatively high vapor pressures needed for winter and early spring driving. The light products in these winter and spring grades of gasoline have a high susceptibility for TEL. Since less of the light material is used in summer-grade gasoline, more TEL is required to raise the fuel to a given octane number. The amount of TEL per gallon of premium gasoline increased 8.1 per cent from April to July. TEL in regular grades increased 14.4 per cent.

The small table shows comparisons of octane numbers and amounts of TEL used in both premium and regular grades from the July du Pont surveys for the past 4 years.

GENERAL COMPARISONS*

	July† 1950	July 1951	July 1952	July 1953
Premium:				
Research Oct. No.	89.8	89.7	90.3	91.0
TEL content (cc. per gallon)	2.32	2.00	2.22	2.40
Regular:				
Research Oct. No.	83.5	83.0	83.5	84.4
TEL content (cc. per gallon)	1.97	1.64	1.85	2.14

*Unweighted averages of 47 cities. †45 cities.

Wage Talks Near Completion

DENVER.—The Oil Workers International Union, C.I.O., announced last week it now has negotiated a general 4 per cent wage increase with virtually all the major oil companies with which it has contracts.

The sole exception, the union said, was Sinclair Oil Corp. and subsidiaries, with whom negotiations were being carried on late last week in New York.

The companies which have signed include Socony-Vacuum Oil Co., Ltd., Gulf Oil Corp., Shell Oil Co., The Texas Co., Richfield Oil Corp., Pure Oil Co., Phillips Petroleum Co., Union Oil Co. of California, Tide Water Associated Oil Co., Continental Oil Co., Atlantic Refining Co., several of the Standard companies, and some smaller concerns.

The pay increases average about 9 cents an hour, comparable to the wage hikes recently won by the steel and automobile workers.

The oil workers' wage scale, the union said, now averages about $2.34 an hour.

Work Begins on New Line

CHICAGO.—The construction has started on all sections of the new Standard Oil Co. (Ind.) products pipe line from Whiting, Ind., to River Rouge, Mich.

R. E. Nelson, Jr., general manager of crude-oil supply and products pipe lines for the company, said last week the new 238-mile, 10 and 12-in. line will permit greater flexibility in Standard's 1,731-mile products system in the Midwest.

The line will be connected with the company's five other lines in the area and can be supplied with products from Standard's Sugar Creek, Mo., and Neodesha, Kans., refineries as well as from the refinery at Whiting.

The new carrier will carry various grades of gasoline, kerosine, furnace oils, heating oils and diesel fuels.

Contractors performing work on the line are: Fred C. Rowley & Sons, Whiting pump station; Morrison Construction Co., 16 miles of 12-in. in Lake County; Great Lakes Dredge & Dock Co., Indiana Harbor Canal crossing; Somerville Construction Co., 102 miles of 12-in.; R. B. Potashnick, Inc., 101 miles of 10-in.; R. L. Coolsaet Construction Co., 18 miles of 10-in.; Parkhill Truck Co., pipe stringing on Potashnick spread.

New Socony Headquarters

New Socony-Vacuum Oil Co., Inc., office building in midtown Manhattan will tower 27 stories and cost about $45,000,000. The company's 2,600 employes in New York will occupy about half of the new structure, between Lexington and Third avenues and Forty-first and Forty-second streets, when it is completed in about 2 years. Socony will make the move from 26 Broadway where it has outgrown quarters built in 1885 for Standard Oil Co. The company signed the largest single lease transaction ever concluded in New York.

Corrosion Course Planned

COLLEGE STATION, Tex.—A short course on basic fundamentals and practical aspects of corrosion will be conducted at Texas A. & M. College here September 22-25.

The course is being sponsored by the South-Central region of the National Association of Corrosion Engineers in cooperation with the college's chemical engineering department, headed by Dr. J. D. Lindsay, who will be in charge of the course.

SOUTHWEST

Case Records to Top Court

AUSTIN.—Court records in the dispute over Texas' natural-gas-gathering tax have been sent to the U. S. Supreme Court by the Third Court of Civil Appeals here.

The tax was first declared unconstitutional by the District Court in Austin then upheld by the appellate court. The state Supreme Court refused to hear an appeal.

The court battle has tied up millions of dollars in state revenue which cannot be spent until the issue is finally decided. The controversial tax—.45 cent per M.c.f.—will have been in effect 2 years next month.

Lease Sold Near Strike

FORT WORTH.—Atlantic Refining Co. has agreed to pay approximately $800,000 to the T. C. Barnsley interests for a 480-acre lease in Crane County, West Texas, near a recent discovery by Gulf Oil Corp.

The acreage is about 11 miles northwest of Crane community. In the vicinity is Gulf's No. 1 C. J. Lea, which was completed in June flowing 1,254 bbl. of 41.2°-gravity oil daily from perforations at 8,165-200 and 8,255-70 ft. in the Ellenburger.

Atlantic has agreed to start an Ellenburger test on the tract within 60 days after details of the transaction are settled.

MORE THAN HALF of the combined crude capacity on the Atlantic Seaboard is represented by these seven refineries located in the concentrated area along the Delaware River in Pennsylvania, New Jersey, and Delaware. An eighth may be located in the industrial complex south of Philadelphia.

Capacity Shifting

Current plant construction will enable Philadelphia to displace Los Angeles as second-largest refining center

George Weber

PHILADELPHIA.—Later this year, Philadelphia is slated to pass Los Angeles as the nation's second-largest refining center.

New construction now under way at most of the 7 refineries located along this 16-mile stretch of the Delaware River, will bring total crude capacity to 770,000 bbl. per stream day by the end of this year.

This compares with projected year-end capacity totals of 720,000 bbl. daily for Greater Los Angeles and 846,000 bbl. daily for the Port Arthur-Beaumont sector which holds undisputed first place as the country's most-concentrated refining center.

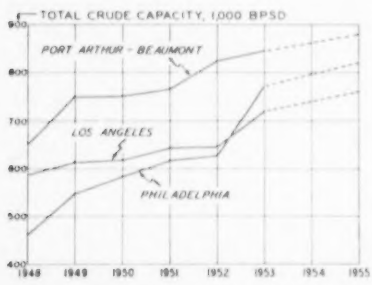
In the light of long-range trends, it is probable that the Delaware Valley sector centering on Philadelphia will hold its No. 2 position in refining. In fact it appears likely that the complex of plants along the Sabine and Neches rivers may be displaced as the greatest single refining area in the next decade. This probability does not however, extend to the relative positions of the entire Eastern Seaboard and Gulf Coast regions, even though some shifting of capacity to the concentrated Eastern markets is indicated for the future.

Like Port Arthur, Philadelphia has a few large refineries operated by major oil companies. Except for a small asphalt plant owned by The Texas Co. at Claymont, Del., the industry is represented by refineries with capacities exceeding 50,000 bbl. daily. The Texas Co.'s Westville, N. J., plant is the only completely new postwar refinery, but current construction is replacing older units in some of the other plants at such a rapid rate that a high percentage of capacity at these plants will be represented by modern processing units.

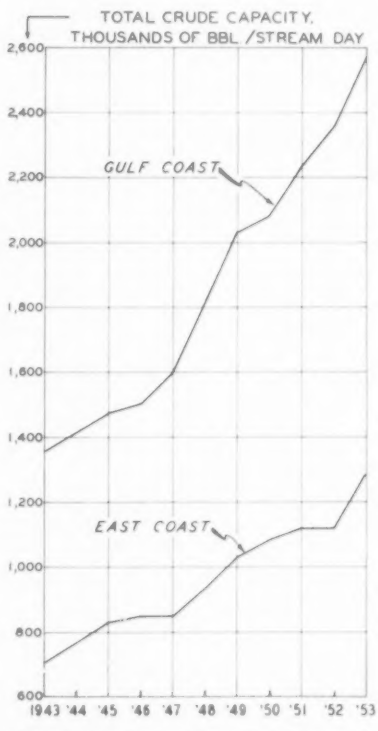
Gulf Oil Corp., for example is building the largest single crude unit in history, a 125,000-bbl.-daily giant which will at the same time increase plant capacity by 75 per cent and retire about 75,000 bbl. daily in older capacity. Atlantic Refining Co. also is hiking capacity substantially, as are Sun Oil Co. and Socony-Vacuum Oil Co., Inc.

Why capacity is growing . . . A combination of factors involving crude supply and market outlets favors the economics of refining in Philadelphia. Much of the crude processed here is imported from Venezuela and the Middle East. Domestic processing of these foreign crudes, which probably will increase in volume over the extended future, will be done almost exclusively in Eastern refineries. Further, some economists predict that domestic crude movements will increase from the Gulf Coast to the East Coast for processing closer to the major marketing centers.

Philadelphia probably will increase its edge over Los Angeles as the second largest refining center, because of a northward shift in refining capacity on the West Coast. While Southern California represents by far the greatest



POSTWAR TRENDS in capacity of the nation's three largest refining centers shows Philadelphia assuming a firm second place.



SHARP GAINS in refining capacity along the Eastern Seaboard still leave the region considerably short of the huge capacity represented by Texas and Louisiana refineries located on deep water along the Gulf Coast. However, the area has shown greater percentage gains than any other in the nation.

MARCUS HOOK REFINERY of Sun Oil Co., shown here, is representative of the large plants centering in the Philadelphia area. Excellent shipping facilities provide for tanker delivery of crude from domestic and foreign fields and for low-cost coastwise movements of products to the concentrated eastern markets.

consumption center on the West Coast, the crude supply from that area shows signs of declining or remaining essentially static. The principal new supply of crude will be laid down in the Seattle area by Trans Mountain Pipe Line, and for the next few years at least, the Pacific Northwest will gain most of the new refining capacity along the Pacific Coast.

East Coast lag . . . While East Coast refiners have expanded capacity substantially since the war, they have increased their share of domestic capacity very little. In this respect they have lagged behind the Gulf Coast to some extent.

In 1946 plants located on deep water along the Atlantic Seaboard totaled about 840,000 bbl. per day in crude capacity, representing about 15.2 per cent of national capacity. By the end of this year, with 1,275,000 bbl. daily, they represent 15.8 per cent of national capacity.

By comparison, Gulf Coast refineries located on deep water increased their share of national capacity from 27.9 per cent in 1946 to 31.4 per cent in 1953. Although the long-term prospects favor new capacity in the East over new Gulf Coast capacity, that trend is not yet in evidence.

Process advantages . . . From the processing standpoint, however, eastern plants have greater flexibility and the capacity for more severe conversion of crude fractions than do Gulf Coast refineries. For example, Philadelphia refineries by the end of this year will maintain catalytic cracking capacity averaging nearly 44 per cent on crude capacity, as compared with 35.5 per cent in Port Arthur-Beaumont and 24.5 per cent in Los Angeles.

For obvious reasons, Los Angeles plants, processing heavier crudes, maintain thermal cracking capacity at nearly 41 per cent of crude capacity, contrasted with 35.5 per cent in Port Arthur-Beaumont and 19.0 per cent in Philadelphia. A number of new catalytic reforming units recently announced for the East Coast will improve the flexibility and octane output by the end of 1954. Including projects firmly contracted, Philadelphia will average about 9.9 per cent of catalytic reforming capacity based on crude, as compared with less than 4 per cent for Port Arthur and about 5 per cent for Los Angeles.

New refineries . . . An additional refinery for the Philadelphia area is indicated from plans of Pan American Refining Corp. The company has options on three prospective sites; near Pedricktown, N. J., just below Philadelphia, in the Providence, R. I., area, and on the Chesapeake east shore. No decision has been reached on location of this proposed 25,000-bbl. refinery, but the site near Philadelphia is believed to be under serious consideration.

Esso Standard Oil Co. recently purchased land in the Norfolk, Va., area for another proposed Eastern refinery. Plans are still indefinite regarding actual construction, but it is understood that the refinery will have a capacity of about 35,000 to 40,000 bbl. daily and will produce a full range of fuels. Shell Oil Co. has for some time shown interest in building an East Coast plant, probably in the Sewaren-Woodbridge area of eastern New Jersey, but plans currently are being held in abeyance.

Expansion plans . . . Refiners in the Philadelphia area hold certificates of necessity covering a total of over $115 million in new plant construction. Included is 206,000 bbl. daily in new crude capacity, some of which would replace existing capacity.

Nearly 115,000 bbl. daily in new fluid catalytic cracking capacity also is being built, together with five catalytic reforming units with an aggregate charging capacity of 58,000 bbl. daily.

CANADA

Gas Rate Set

Alberta gas would market for 55 cents in the East

CALGARY. — Trans Canada Pipe Lines, Inc., could sell Alberta natural gas at 55 cents per M.c.f. wholesale in Ontario and Quebec and earn 7 per cent on its investment after taxes, according to Ford, Bacon & Davis, consulting engineers of New York and Toronto.

The estimate was contained in a report by the engineering firm presented on behalf of Trans Canada at the current hearings before the Alberta Petroleum and Natural Gas Conservation Board on proposals for exporting gas from the province.

The gas rate and earnings figures were based on a sales volume of about 96 billion cubic feet during the first full year of operation, increasing to 155 billion cubic feet during the fifth year.

Trans Canada is seeking permission to lay a trunk line from Alberta fields north of the lakes to Ontario and Quebec which would serve more than 200 communities with a population in excess of 4,500,000. Cost of the construction of the main line and laterals initially would be more than $252,000,000. About $70,000,000 more would be required during the second year of operation for additions to the line.

Trans Canada's opponent in the current hearing, Western Pipe Lines, Ltd., is backing a proposal to lay a line east as far as Winnipeg, Man., thence south to serve the St. Paul-Minneapolis area in the United States. Western's plan also proposes extension of this system to serve eastern Canadian markets, but this would not be done for at least 5 years.

R. T. Ritchie, chief witness for the firm, said that construction of the extension would hinge on a future decision by the company's financial backers as to whether the market in Ontario and Quebec was sufficient to warrant laying a line to serve that area *(The Oil and Gas Journal, July 27, page 217)*.

Gas Waste Alleged

California's amended conservation laws to undergo test in suit filed by state against Coalinga Nose operators

D. H. Stormont

FRESNO, Calif.—Operators in the Coalinga Nose field, northern San Joaquin Valley, were ordered to appear in Superior Court here July 31 to show cause why they should not be restrained from alleged wasting of natural gas.

The court order followed the filing of a complaint by state Atty. Gen. E. J. Brown that 12 West Coast oil companies were violating state conservation statutes. While all companies participating in the unit-operated portion of the field were accused of excessive gas production, there seems to be little question the charge is directed primarily against two operators outside the unit.

During last May the five wells owned by Steele Petroleum Co. and Pray & Walker had average gas-oil ratios of about 14,000 cu. ft. per barrel. Average ratio for the unit's 106 producers was less than 800, and their net ratio was only about 330 cu. ft. per barrel.

In the petition it was alleged that the field's gas production of 45,000 M.c.f. daily was an unreasonable waste of gas in that the energy was needed to maintain reservoir pressures. Continued depletion of the reservoir energy would result in the eventual loss of 100,000,000 bbl. of crude, it was contended.

The average field gas-oil ratio during May, when 1,431,835 bbl. of oil was being produced, was approximately 1,000 cu. ft. per barrel. This was almost twice that of last September. During the month, however, an average of about 20,000 M.c.f. of gas daily was injected into the Gatchell sand through upstructure wells in the unit.

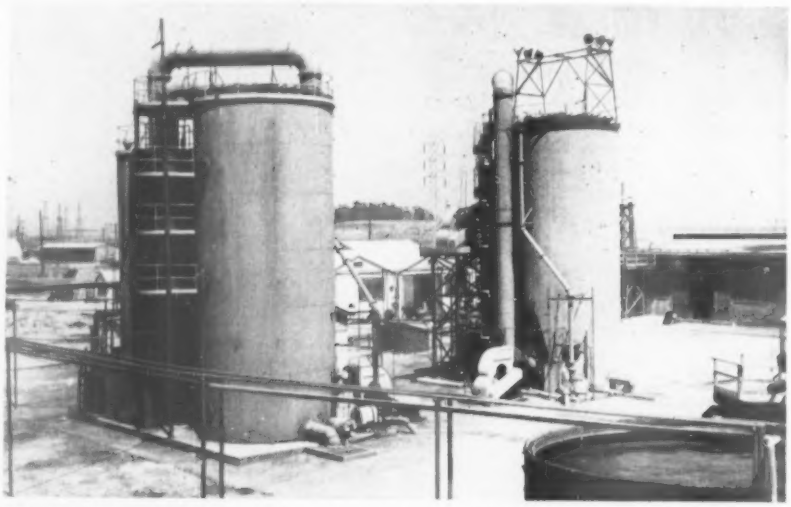
Of the 1,436,971 M.c.f. of gas produced by Coalinga Nose wells, almost one-fourth of it came from the five wells outside the unit. Three wells of Pray & Walker, with an average GOR of 18,000 cu. ft. per barrel, produced 329,200 M.c.f. Steele's two wells had an average ratio of about 8,500 cu. ft. per barrel in producing 60,100 M.c.f.

Suit welcomed . . . Officials of Los Nietos Oil Co., unit operator, and Union Oil Co., Standard Oil Co. of California, Honolulu Oil Corp., and The Texas Co.—all of which were named as defendants—welcomed the suit as an opportunity to test the state's amended conservation statutes. Some unit members believe legal action under Section 8b is the solution to the oil-drainage problem which has plagued the unit since gas injection was first started in April 1950 *(The Oil and Gas Journal, September 15, 1952, page 73)*.

Sam Grinstelder, vice president in charge of the field operations for Union and Los Nietos, said the unit properties have at all times been operated in accordance with sound engineering practices; that they "welcomed the opportunity to have the facts regarding the operations in this field brought before the court."

T. C. Moroney, of Honolulu, declared the suit is further evidence of the need for a sound state conservation law, adding that "we are anxious to determine the true parties responsible for gas wastage."

In addition to the above companies, McAlester California Oil Co., Seaboard Oil Co., Superior Oil Co., and other individuals were named as defendants.



IODINE SEPARATION from brine at the Seal Beach plant is accomplished in the tower at left by blowing out with air. The iodine is stripped from the air in the tower at right and further processed.

Valuable Waste

Brine disposal no problem in some California fields

LOS ANGELES.—Except for that from a few fields in the Los Angeles Basin area, all of the 1,700,000 bbl. of brine being produced daily by California wells presents a disposal problem to the operator.

Because the brines produced by some zones in these few fields have an unusually high concentration of iodine compounds, operators delivering large quantities are paid royalties. Where an operator can deliver only small amounts the brine may be taken off his hands at the wash tank or skimming pit, thereby relieving him of the cost of cleaning up the water so that it can be disposed of.

More than 90 per cent of the domestic iodine supply comes from three Dow Chemical Co. plants which process these brines. Their output represents about 50 per cent of the more than 1,500,000 lb. annually consumed in this country.

High concentration . . . The concentration of iodine in these brines is the highest in any domestic oil fields. The content of that from the Venice shallow zone is 125 p.p.m., that of a Seal Beach brine about 85 p.p.m., and those from Signal Hill and Alamitos Heights average 50 and 65 p.p.m., respectively. These are substantially above those of most oil-field brines and compare with less than 0.1 p.p.m. for ocean water.

The composite brine processed at Dow's Venice, Inglewood, and Seal Beach extraction plants usually ranges between 62 and 67 p.p.m. Using an

improved air blowing-out process, between 88 and 92 per cent of the iodine is recovered. All processing of the precipitated iodine to a finished granular product, and to potassium iodide, is carried out at the Seal Beach plant. The concentrated liquor from the other two is trucked to Seal Beach in rubber-lined tanks.

Development Plan Sought

LONG BEACH, Calif. — Development of City of Long Beach submerged oil lands seaward of the former stipulated line moved a step nearer when the Board of Harbor Commissioners July 27 asked that recommendations for a development contract be submitted.

The area under consideration, totaling about 500 acres, lies south of Long Beach Oil Development Co. and Richfield Oil Corp. Parcels in the Harbor district, Frank Hardesty, chief petroleum engineer for the Harbor Department, said about 75 wells would be needed, based on present knowledge of producing limits. They would be Ranger and Tar sand producers and would be slanted from well sites on Victory Pier.

Asked to recommend methods for developing the area, E. J. Amar, Harbor general manager, said he would recommend calling for bids. Alternative bids should be sought he believed, on the entire 500 acres and on splitting the area into two parcels.

During the meeting the board also approved 43 new well locations for Parcel A, for which Richfield is the contractor. Drilling of these will complete development of the parcel.

NATIONAL AFFAIRS

Imports Hit Peak

May crude shipments set new high of 668,700 bbl.

IMPORTS of crude and products increased and exports decreased in May, according to data compiled by the Census Bureau of the Department of Commerce.

Total imports averaged 1,056,000 bbl. daily in May, an increase of 65,000 bbl. daily over April which was the lowest month since last November. Most of the gain over April was due to increase receipts of crude oil.

Crude imports reached an all-time high in May for a daily average of 668,700 bbl. This represented an increase of 51,500 bbl. daily over April and a gain of 16,400 bbl. daily over the prevoius record that was established in March of this year.

Venezuelan shipments up . . . Imports of crude from Venezuela averaged 341,600 bbl. daily for an increase of 58,000 bbl. daily over April. Receipts from Colombia were up 7,200 bbl. daily, and Mexican crude gained 3,900 bbl. daily. Total crude imports from Latin American countries averaged 403,400 bbl. daily, the highest level since last October. Crude from the Middle East was down 19,600 bbl. daily in May compared with April.

Product imports in May were only 13,000 bbl. daily larger than in April and were 10,000 bbl. daily less than a year earlier. The decreases are due to reclassification of some material from Mexico which had been classified as unfinished products and which now is listed as crude, following a check by the Census Bureau.

Exports of crude and products, excluding shipments to territories, averaged 329,800 bbl. daily in May, the lowest since last October. Decreases from April were reported for crude and for all major product classifications with the exception of lubricants. The increase in exports of lubricants was only 1,300 bbl. daily.

IMPORTS INTO CONTINENTAL UNITED STATES

(Thousands of barrels)

	May 1953	April 1953	May 1952
Crude—			
Mexico	456	323	190
Colombia	1,460	1,197	1,037
Venezuela	10,588	8,507	9,577
Kuwait	2,586	2,785	2,617
Saudi Arabia	3,646	3,649	2,037
Iraq		355	
Qatar	385	202	
Canada	204	154	1
Far East	1,404	1,344	111
Total crude	20,729	18,516	15,570
Daily average	669	617	502
Products—			
Residual fuel	11,394	10,519	10,850
Other products	617	699	1,458
Total products	12,011	11,218	12,308
Daily average	387	374	397
Total all oils	32,738	29,734	27,878
Daily average	1,056	991	899

EXPORTS*

	May 1953	April 1953	May 1952
Crude	1,611	2,832	1,718
Gasoline	2,179	3,235	967
Kerosine	500	857	949
Distillate fuel	2,525	2,942	2,636
Residual fuel	1,591	1,971	2,500
Lube oils	1,012	938	1,449
Other products	805	823	839
Total all oils	10,223	13,598	11,058
Daily average	330	453	357

*Excludes shipments to territories.

Imports Bill Killed

House refuses to impose quotas on oil shipments

WASHINGTON. — Whether there shall be any form of restrictions upon imports of oil or products has been left up to the next Congress.

The House voted 242 to 161 against the Simpson bill, killing this particular legislation for the present session. This action along with extension of the Reciprocal Trade Agreements Act would endorse fully the President's foreign-trade program. Conflicting bills concerning this extension are being disputed in both houses.

The House bill calls for the former bipartisan commission operating under the act to be given a majority of one Republican member, and this member would assist somewhat the procedure for protecting domestic industries in cases of complaints of harm from imports. The Senate bill refuses to make any change in the commission. The bills are now in conference.

Despite the delay in the action on the Reciprocal Trade Agreements Act, Eisenhower has obtained congressional permission to create a commission to study the whole foreign trade and tariff policy.

Reach Tidelands Compromise

WASHINGTON.—Senate and House conferees have reached agreement on the bill providing for federal administration of the submerged oil lands beyond state boundaries.

Senate members of the conference committee were forced to discard the Hill amendment which would have earmarked federal revenue from offshore operations for aid to education. This was expected to cause some furor when the conference report came up for Senate approval late last week.

The Hill amendment was the chief point of disagreement.

Minerals Agency Proposed

WASHINGTON.—A bill to create a Department of Mineral Resources for handling Government functions relating to the oil and other minerals, has been introduced in the Senate by James E. Murray and Mike Mansfield, Montana Democrats.

Presently, these functions are under the Interior Department. Senator Murray claims that the minerals industry has grown so large that it "should no longer be represented in the Government by an agency concerned principally with electric power, irrigation, public lands, and Indians."

TREND IN TANKERS is toward bigger and faster vessels. One of these is the P. C. Spencer, flagship of Sinclair Refining Co.'s fleet. Shown recently entering New York Harbor, she carried 170,000 bbl. of heating oil, the largest single shipment to enter the port.

Tanker Boom Near Peak

Postwar building surge outdistancing projected growth in Free World demand; tanker fleet faces overcapacity threat

George Weber

NEW YORK.—All available signs indicate that the tremendous surge in tanker construction over the world since the end of World War II is approaching a peak.

Further, some observers look for a substantial cutback in construction.

Since the close of World War II the world tanker fleet has gained significantly in total carrying capacity and in the size and speed of individual vessels. Tanker construction currently is at a peace-time high. This year an estimated 4,500,000 d.w. tons in modern tankers will join the world fleet.

Those who predict that building is nearing a peak and soon will taper off base their argument on four points. They say:

. . . There has been a slight decline in the backlog of shipyard business—tankers on order or under construction.

. . . Deliveries of many large tankers during the past several months have already brought the world tanker fleet into balance with world oil demand.

. . . The projected increase in Free World demand is not keeping pace with expected growth in the tanker fleet.

. . . Orders now on the books for new tankers in some instances are expected to be canceled.

If the imbalance should continue, the average vessel size and speed of the future fleet may well increase even more sharply since modern tankers would replace older vessels.

U. S. position slipping . . . Much concern is felt in some domestic circles over the loss of the substantial lead which the United States tanker fleet maintained at the close of the last war. In late 1945, 60 per cent of the world's tanker tonnage was under the American flag. Today our fleet represents less than 30 per cent, and indications drawn from projected construction and retirement trends show this country's probable share of the world tanker tonnage as less than 22 per cent by 1957.

These figures represent vessels flying the American flag. A strong recent trend to licensing privately owned American tankers under the flags of friendly foreign countries, shows considerably higher tonnage percentages which are controlled in this country. Including many United States owned vessels flying the Panamanian, Honduran, Liberian and other flags, our controlled tanker fleet now represents about 41 per cent of the total in the world.

In Washington, two Congressional committees are inquiring into the problems of the American Merchant Marine with particular reference to our declining position in the world tanker fleet. One corrective measure, proposed by the Department of Commerce, calls for Government expenditure of $55,000,000 to $60,000,000 to purchase about 40 war-built tankers from private operators for the national reserve fleet. This would provide funds for the building of more modern tankers by private companies. Bills authorizing such action, now under consideration, are experiencing some opposition. Further, the administration is not certain where the necessary funds would come from. The Defense Department has no money available for this purpose, and the Commerce Department is not contemplating any direct request for appropriations for such a tanker program at present.

Still No. 1 . . . While the United States may have lost much of its lead in the world tanker fleet, it is still in No. 1 position. As a result of the recent construction of large modern vessels, it also maintains the second fastest fleet on the seas. The average for all tankers flying the American flag is 14.6 knots. Liberia, under whose flag many postwar tankers have been registered, shows an average speed of 14.8 knots.

The accompanying table, based on data compiled by Sun Oil Co., shows the relative sizes of tanker fleets throughout the world. The sharp decline in United States tonnage occasioned by the disposal of government-owned bottoms more than offset the 3,000,000 d.w. ton net increase in privately owned tankers flying the American flag.

Several countries have shown substantial postwar gains in tanker tonnage flying their flags. The United Kingdom, in second place, has improved its position percentagewise, as has France, ranked fifth. The trend toward foreign registry has boosted the absentee-owned fleets of Panama by 2,000,000 d.w. tons, and Liberia by 1,000,000, ranking those two countries fourth and sixth respectively.

The domestic coastwise movement of crude and products in ocean-going tankers is handled predominantly by United States flag vessels. During the past 3 years, however, the participation of American tankers in foreign move-

ments to and from our shores has shown a substantial decline. According to the reports of the American Bureau of Shipping, over 60 per cent of all crude and products involved in United States imports and exports was carried in American tankers from 1946 through 1949.

This share dropped from 53 per cent in 1950, to 46 per cent in 1951, and to 38 per cent last year. During the first quarter of this year the average further declined to about 30 per cent. This loss of position by United States tankers is a result of the increase in foreign registration of domestically owned tankers and the inroads made by foreign-owned tankers, chartered in many cases by American companies.

Foreign registry . . . The phenomenal rise of a small group of individuals owning tanker fleets through numerous companies, is an important factor in the postwar shift away from tonnage registered or even controlled in the United States. Prominent among these is A. S. Onassis, a native of Greece and presently an Argentine citizen, who is said to control more than 1,250,000 d.w. tons and 90-odd tankers in service or under construction. He is one of a clan of expatriate Greeks who have assembled vast fleets of tankers registered under the flags of Panama, Honduras, Liberia, and other countries which offer low registration and income taxes. This group of individuals is presently active in building new supertankers and is to all appearance increasing its ownership share of the world fleet at a rising rate.

In order to remain competitive, many American companies both in and outside the oil industry, have found it necessary to adopt foreign registry for tankers. One industry representative testifying recently before a Senate subcommittee, said that operation under Panamanian registry is considerably more efficient than operation under the United States flag. He expressed absolutely no fear about the reliability of Panamanian flag ships in an emergency, stating as have others, that such tankers are under close control of their American owners.

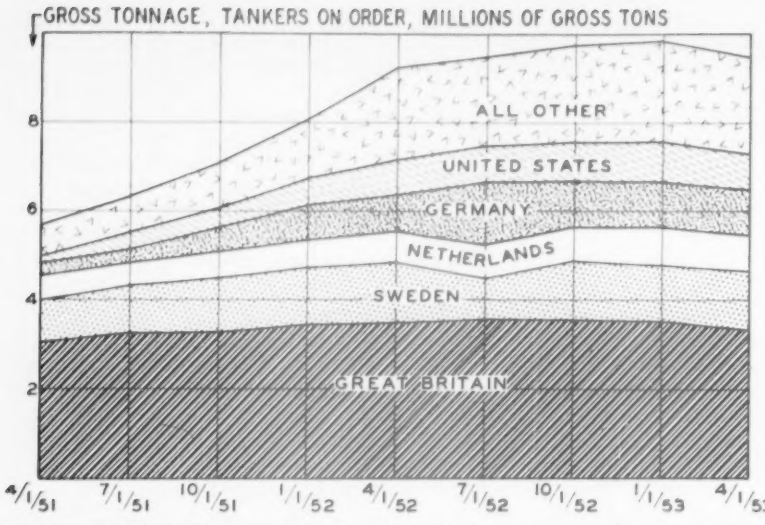
As a result of the "far higher costs" of operating under the American flag, some United States shippers have greatly expanded their controlled tanker fleets of foreign registration. For example, present foreign-flag tanker capacity controlled by American companies totals nearly 300 tankers with aggregate deadweight tonnage of about 4,500,000. This represents about 35 per cent of the United States-controlled fleet and is half the size of the United States flag fleet in total tonnage.

Supertankers . . . A revolution is taking

Statistical Picture of the World Tanker Fleet

	October 1, 1952				Changes to October 1, 1952, from				Tankers on order or under construction Oct. 1, 1952*	
					April 1, 1951		September 1, 1945			
Flag—	No.	Thousands of d.w. tons	Average speed (knots)	Per cent world total	No.	Thousands of d.w. tons	No.	Thousands of d.w. tons	No.	Thousands of d.w. tons
United States	550	8,446.4	14.6	29.4	— 10	— 74.4	—357	—4,932.7	32	762.3
Government	122	1,695.4	16.2	6.5			—524	—8,032.5		
U.S.M.A.	4	46.7	10.5	0.1	— 3	— 12.0	—536	—7,993.8		
Military	118	1,648.7	16.4	6.4	+ 3	+ 12.0	+ 12	— 38.7		
Private	428	6,751.0	14.2	22.9	— 10	— 74.4	+167	+3,099.7		
Oil companies	288	4,624.9	14.3	15.8	— 6	— 25.0	+ 80	+1,701.2		
Nonoil companies	140	2,126.1	14.1	7.1	— 4	— 49.4	+ 87	+1,398.6		
Panama	194	2,946.0	13.6	9.6	+ 13	+ 158.5	+122	+2,126.1	86	2,077.7
U. S. citizen	119	2,031.9	14.5	7.0	— 17	— 217.3				
Canada	15	201.0	14.2	0.7	— 6	— 36.8		(†)	9	203.4
Latin America	118	1,192.1	12.6	3.6	— 6	+ 170.4	+ 50	+ 705.0	7	97.6
Western Hemisphere	877	12,785.5	14.2	43.3	+ 3	+ 217.7	—185	—2,101.6	134	3,141.0
ECA countries	1,249	16,250.4	12.8	49.4	+119	+2,218.7			556	10,740.7
Belgium	8	100.5	12.3	0.3			+ 4	+ 58.6	2	56.1
Denmark	31	460.2	13.3	1.4	+ 6	+ 98.7	+ 27	+ 399.8	16	269.9
France	89	1,257.1	13.0	3.9	+ 15	+ 269.1	+ 74	+1,095.0	34	735.1
Germany	14	161.9	10.3	0.4	+ 4	+ 28.3	— 26	— 326.8	9	152.4
Greece	13	166.2	13.3	0.5	+ 2	+ 17.8	+ 9	+ 138.9	4	81.0
Italy	92	1,119.3	12.6	3.4	+ 16	+ 221.8	+ 70	+ 940.1	18	374.5
Netherlands	108	879.9	11.9	2.5		— 7.6	+ 43	+ 428.6	39	738.1
Norway	321	4,767.1	13.2	14.9	— 32	+ 706.1	+156	+2,651.8	192	3,543.3
Portugal	6	84.1	13.7	0.3	+ 1	+ 31.9	+ 4	+ 71.1	1	16.5
Sweden	55	817.6	13.7	2.7	+ 15	+ 253.0	+ 18	+ 322.3	44	793.0
Switzerland	2	22.4	10.6	0.1			+ 2	+ 22.4	1	18.0
Turkey	3	34.7	12.7	0.1	— 1	— 9.0	+ 2	+ 25.7		
United Kingdom	507	6,379.4	12.4	18.9	— 29	+ 608.6		(†)	196	3,962.8
Other European	54	508.5	11.1	1.4	— 4	+ 62.3	+ 11	+ 107.9	13	201.4
Finland	7	78.5	10.3	0.2	+ 1	+ 11.0	+ 7	+ 78.5	3	45.8
Poland	2	21.3	10.9		— 1	+ 12.0	+ 2	+ 21.3		
Spain	24	203.2	11.5	0.6	— 2	+ 16.9	+ 4	+ 52.3	9	142.3
U.S.S.R.	19	183.8	11.1	0.5		— 14.1	— 3	+ 62.6	1	13.3
Yugoslavia	2	21.7	11.5	0.1		+ 8.3	+ 1	+ 18.4		
Total Europe	1,303	16,758.9	12.7	50.8	+123	+2,281.0			569	10,942.1
Japan	44	597.2	13.3	1.9	+ 8	+ 166.9	— 19	— 98.9	6	123.6
Liberia	56	1,087.6	14.8	3.8	+ 27	+ 414.9	+ 56	+1,087.6	26	727.3
All others	12	89.1	10.0	0.2		— 17.3	+ 5	+ 44.2	18	552.9
Total world	2,292	31,318.3	13.4	100.0	+161	+3,063.2	+381	+7,402.0	753	15,486.9
British Empire	529	6,625.3	12.5	19.7	+ 26	+ 591.8	+130	+2,535.1	206	4,169.3
U. S. controlled (all flags)	839	12,852.6	14.4	44.1	— 4	+ 45.9				

*Listed by countries of future registry. †In 1945, Canada, India, New Zealand, Pakistan and some British colonies were included with United Kingdom.



TANKER CONSTRUCTION throughout the Free World may be approaching the leveling-off point. Total gross tonnage in tankers on order or under construction showed a slight drop from January 1 to April 1 this year. Although figures are not yet available for July 1, new orders placed since April indicate that the backlog has continued to shrink. Chart courtesy of Shipbuilders Council of America.

place in the construction of new supertankers. In size and speed they greatly outclass the T-2 vessel. At the end of World War II, the average capacity of all ocean-going tankers of 1,000 d.w. tons and over, was 12,500 d.w. tons. This average rose to 13,500 tons by the spring of 1951 and is presently about 13,700 tons. By contrast, the tankers on order or under construction throughout the world today, show an average of 26,600 d.w. tons per vessel. The new tankers also are much speedier. The average of new vessels contracted is 16.0 knots as compared with the present average speed of 13.4 knots for all tankers now in operation.

The supertankers represent a large share of new construction. For example, Shipbuilders Council of America reports that as of July 1, United States shipyards had on their books, a total of 39 ocean-going tankers which were either on order or already under construction. Of these, 11 were in the 16,000 to 20,000-d.w. tonnage class, 7 ranged between 20,000 and 29,000 d.w., 12 were grouped in the 29,000 to 30,000 d.w. class, and 8 will have deadweight tonnage ratings of between 30,000 and 40,000.

One vessel now under way will have a tonnage of 45,000, with an equivalent capacity for about 375,000 bbl. of oil. This giant is being built at Bethlehem Steel Co.'s Quincy yards for World Tankers Co., Inc.

The trend toward big tankers is by no means restricted to United States shipyards. Most of the bigger ones are to be built abroad. In late July the largest tanker in the world was launched at Hamburg, Germany. This ship, named the Tina Onassis for the wife of the world's largest individual tankship operator, measures over 775 ft. in length, has a beam of 95 ft., and will draw more than 37 ft. of water. It will be operated by Onassis' Olympic Transportation Co. of Monrovia, under the Liberian flag.

Two tankers of even greater size are now on order in foreign shipyards. They will have a deadweight tonnage of 46,000 and each will handle about 385,000 bbl. of crude. Two even larger ships are to be built in Japan. They will have a rating of 60,000 d.w. but will transport both ore and oil, and are not strictly tank ships.

The total world backlog for planned construction now includes the two 46,000 d.w. jobs mentioned above, six of the 45,000-ton class, two of 44,000 d.w. each, six of 38,000 d.w., and four of 34,000 d.w. Altogether, the shipyards of the world have on order, tonnage equal to 50 per cent of the total tonnage presently afloat. Barring the cancellation of many of these orders for supertankers, the world fleet will continue the sharp rise in operable capacity, in larger, more modern bottoms.

Industry Briefs

LONGVIEW, Tex.—First oil-field casing to be produced entirely from East Texas iron ore in a continuous operation, has been turned out by Lone Star Steel Co.'s new plant near here. An estimated 400,000 tons a year in tubular goods will be coming off the production lines when the plant goes into full operation.

BAKERSFIELD, Calif.—The deep test being drilled by Ohio Oil Co. in Paloma field, central San Joaquin Valley, on July 27 passed the 20,000-ft. mark. Its depth was 20,003 ft. according to company reports. Unless mechanical difficulties arise, 72-4-K.C.L.-A will pass the existing depth record of 20,521 ft. before September 1. Hole currently is being made at the rate of approximately 125 ft. per week.

WICHITA, Kans. — The August crude-oil-production allowable for Kansas wells has been set by the Kansas Corporation Commission at 320,000 bbl. daily, the same as in July. Production since mid-June has averaged 333,525 bbl. per day.

LOS ANGELES.—Hearing on the appeal of Monterey Oil Co. and the California State Lands Commission, in the suit pertaining to the city of Seal Beach's police powers over a drilling island Monterey is seeking to construct, has been set for August 17 in the Fourth District Court of Appeals at San Diego. Lower-court rulings have held the city has jurisdiction over the drill site even though it is 1½ miles offshore on a lease granted by the Lands Commission.

OKLAHOMA CITY. — Oklahoma's August and September daily crude-production allowable has been left unchanged from July at 519,260 bbl. per day by the Oklahoma Corporation Commission. Walker T. Pound, director of conservation, reported to the commission that new wells and petitions by operators to make up underages put actual production at approximately 543,000 bbl. daily.

BATON ROUGE.—Louisiana's daily crude allowable for August has been set at 702,471 bbl., an increase of 3,408 bbl. over July for new production. North Louisiana fields have been allotted 115,920 bbl. daily, while South Louisiana will be permitted to produce 586,551 bbl. a day.

EDMONTON, Alta.—The provincial government will hold a sale of oil and natural-gas rights here in August, according to D. F. Morrison, Alberta mining recorder. The leases up for auction are located on 35 sections of land in northern Alberta.

Crude Production Dips

Free-World output drops slightly for fifth consecutive month; big Middle East gains offset by decline in U. S.

Dahl M. Duff

CRUDE-OIL production in the Middle East soared to another all-time high in May, while output from the world's other major producing areas again dropped back.

This continued the pattern that has been followed since the beginning of the year. In contrast to the greatly expanded volume of oil coming from the Middle East, production in the United States has declined while that of Caribbean area has held relatively steady.

Kuwait's output in May of 899,600 bbl. daily by Kuwait Oil Co., Ltd., was the highest producing rate ever achieved by a single company. It was not only a new record for Kuwait but also a new high for the countries of the Middle East.

The sharp gain in production in the Middle East in May was more than offset by drops in other foreign fields and in the United States, and as a result, total Free World production was down slightly from the previous month. The average of 11,735,700 bbl. daily compared with 11,744,600 bbl. daily during April.

Output in the United States during May was an estimated 6,346,000 bbl. daily, down slightly more than 100,000 bbl. daily from the revised total for April. Production in the Middle East jumped about 97,000 bbl. daily, or 4 per cent, to reach 2,523,900 bbl. daily, but declines elsewhere abroad reduced the total foreign increase to 91,400 bbl. daily.

As compared with May 1952, total non-Communist foreign production was up 6.5 per cent. Middle East production was 17.8 per cent above the same month of 1952. A similar comparison involving United States production was distorted by the oilworkers strike in May 1952, which drastically curtailed domestic output in that month. For this reason, United States production in May showed an income of 1,239,200 bbl. daily, or 24.2 per cent over May 1952.

A more accurate indication of producing trends is given by a comparison over the last 5 months, or since December when both United States and foreign production was at record level to that date. From its record performance of 6,633,700 bbl. daily in December, United States output had dropped 287,700 bbl. daily, or 4.3 per cent, by May.

On the other hand, total non-Communist foreign production in May was 314,700 bbl. daily, or 6.2 per cent, above the December total. This includes the Middle East which during this 5-month period rose 431,800 bbl. daily, or 21.3 per cent. With the foreign increase balanced by the decline in domestic output, the Free World total showed a negligible rise of 27,000 bbl. daily.

Latin America . . . Venezuela's May production of 1,740,100 bbl. daily was little changed from the previous month. Crude output of this dominant oil-exporting country hit a peak of 1,866,000 bbl. daily last December but has remained below 1,800,000 bbl. daily the first 5 months of this year. Production in Venezuela by weeks was: week ended May 4, 1,741,900 bbl. daily; May 11, 1,748,400 bbl. daily; May 18, 1,728,600 bbl. daily; and May 25, 1,741,500 bbl. daily.

Colombian production was off 7,300 bbl. daily from the average in April.

The preliminary report on Mexican production in May showed a sharp drop of 13,600 bbl. daily to an average of 192,700 bbl. daily.

Canada . . . As scheduled, Canadian production rose considerably as a result of opening of shipping on the Great Lakes and summer demand. The 202,000 bbl. daily shown in preliminary reports was a new record, exceeding the previous high of 198,000 bbl. daily last October.

CRUDE-OIL PRODUCTION

(In thousands of barrels)

Country—	May 1953	April 1953	May 1952
W. Hemisphere:			
Argentina	78.0	77.7	66.2
Bolivia	1.4	1.5	1.5
Brazil	2.8	2.7	1.7
Canada	202.0	179.7	180.2
Chile	3.1	3.2	2.2
Colombia	105.5	112.8	107.8
Cuba	0.1	0.1	0.1
Ecuador	8.0	7.8	7.6
Mexico	192.7	206.3	213.6
Peru	44.0	41.7	44.7
Trinidad	62.0	61.7	57.2
Venezuela	1,740.1	1,744.6	1,844.4
Total	2,439.7	2,439.8	2,527.2
Europe & Africa:			
Algeria	1.9	1.9	0.5
France	7.2	7.3	6.8
Fr. Morocco	2.1	2.1	2.2
W. Germany	41.8	40.9	32.7
Italy	1.9	1.9	0.9
Netherlands	16.2	16.3	13.8
Egypt	47.0	47.7	44.5
United Kingdom	1.1	1.1	1.1
Total	119.2	119.2	102.5
Middle East:			
Bahrein	29.9	30.0	30.0
Iran	32.0	24.2	30.6
Iraq	584.3	568.9	402.1
Kuwait	899.6	858.0	778.0
Qatar	90.2	85.7	64.9
Saudi Arabia	887.4	859.5	836.2
Turkey	0.5	0.5	0.3
Total	2,523.9	2,426.8	2,142.1
Other Asia:			
British Borneo	80.0	90.0	103.9
Burma	2.5	2.5	2.2
India	6.0	6.0	6.0
Indonesia	204.0	200.0	160.8
Japan	5.0	4.6	5.7
New Guinea	4.9	4.9	4.8
Pakistan	4.5	4.5	3.8
Total	306.9	312.5	287.2
Total non-Communist foreign	5,389.7	5,298.3	5,059.0
U. S.	6,346.0	6,446.3	5,106.8
Total free world	11,735.7	11,744.6	10,165.8
Est. Russia and E. Europe:			
Austria (Soviet Zone)	60.0	60.0	50.0
Romania	80.0	80.0	80.0
Russia	1,035.0	1,035.0	935.0
Other Communist	31.1	31.1	26.2
Total	1,206.1	1,206.1	1,091.2
World total	12,941.8	12,950.7	11,257.0

Figures are from reliable reports in the industry or official government sources. Data for Russia and Eastern Europe are based on competent estimates; no authentic information is available on month-to-month production in these areas. Completely current reports also are lacking for certain other countries, particularly in Southeast Asia. Data for earlier months have been revised where appropriate. In the estimates for Russia and Eastern Europe, other Communist includes China and Yugoslavia along with the Soviet satellite countries in Europe.

TREND OVER THE LAST YEAR
(Thousands of barrels daily)

1952—	Western Hemisphere less U. S.	Middle East	Total non-Communist foreign
June	2,517.8	2,208.9	5,117.6
July	2,495.0	2,126.1	5,018.7
August	2,425.5	2,091.7	4,921.7
September	2,417.8	2,168.2	4,994.8
October	2,455.8	2,175.1	5,047.2
November	2,504.9	2,174.7	5,098.7
December	2,561.3	2,092.1	5,075.0
1953—			
January	2,472.8	2,252.3	5,152.2
February	2,407.2	2,258.4	5,096.8
March	2,412.5	2,266.1	5,104.8
April	2,439.8	2,426.8	5,298.3
May	2,439.7	2,523.9	5,389.7

Middle East . . . May marked the first time in which production in the Middle East has gone above the 2,500,000-bbl. daily mark. The 2,523,900 bbl. daily for the month represented the seventh consecutive monthly record that has been established by crude output of this region. The second-quarter Middle East production has caused upward revisions in some industry estimates that were made earlier.

Kuwait's present position as the world's fourth largest producing country, after the United States, Venezuela, and Russia, is even more remarkable in view of the fact that the shaikhdom did not begin commercial operations until about six years ago. During the first 5 months of this year, Kuwait maintained a slight lead over Saudi Arabia. Saudi Arabia's January-May average was 825,300 bbl. daily; Kuwait's average during the same period was 828,400 bbl. daily.

Another in a succession of production records was hung up in May by Iraq, the third leading Middle East producing country. Iraq's total of 584,300 bbl. daily included 480,100 bbl. daily from Kirkuk and 64,200 bbl. daily from Zubair, new peaks in these individual fields.

Among the other Middle East countries, a new production record was set in Qatar which had an output of 90,200 bbl. daily. Figures received from the National Iranian Oil Co. in Iran disclosed gross and net production for the first 5 months of 1953. Not including products recycled, net output was as follows: January 18,400 bbl. daily; February 20,200 bbl. daily; March 22,400 bbl. daily; April 24,200 bbl. daily; and May 32,000 bbl. daily. The increase in May apparently reflects oil sales made to independent Italian and Japanese interests.

Estimated production in British Borneo during May was down considerably. The reduction was caused by the two gas eruptions in Seria field which forced a partial shutdown for safety reasons.

Price Hike Stabilized

Middle East crude boost shakes down to 22 cents a bbl. in Persian Gulf area, 10 cents in East Mediterranean

A SERIES of adjustments last week brought the verity of different selling prices announced for Middle East crude oil down to a common level.

The Middle East crude increases were touched off July 10 by Gulf Oil Corp.'s 25-cent boost in Kuwait. The higher prices announced subsequently by all other companies were far from uniform, and for a time, there were two or three different quotations for the same crude at the same loading point.

Then, one by one, came the reductions to meet the lowest competitive figure. By the middle of last week, the pattern that emerged was for a 22-cent increase in the Persian Gulf itself and a 10-cent hike at the eastern Mediterranean pipe-line terminals.

Persian Gulf prices . . . Saudi Arabian crude of 36° gravity at Ras Tanura is now priced at $1.97 against $1.75 formerly. This 22-cent raise was set by Mid-East Crude Sales (Caltex) and met by the other two Arabian sellers, Esso Export (Jersey Standard) and Socony-Vacuum Overseas Co. (Socony-Vacuum). Caltex actually quotes $1.93 for 34°-gravity crude at Ras Tanura with the usual 2-cent differential. Arabian crude this year will average out to close to 34° gravity.

In order to maintain the 15-cent quality differential for Kuwait crude, Anglo-Iranian Oil Co., Ltd., cuts its original 25-cent increase for Kuwait crude back to 22 cents. This made the price for Kuwait crude in the Persian Gulf $1.72 for 31° gravity. Considering the 5° lower gravity, this is 15 cents under Arabian crude. Gulf was expected to follow with a 3-cent reduction in its original 25-cent hike.

Mediterranean . . . In the eastern Mediterranean, the price for 36°-gravity crude at Sidon is $2.39, a 10-cent increase set by Jersey and followed by Caltex and Socony. The same price prevails for 36°-gravity crude sold at Banias and Tripoli by Jersey and Socony. Higher increases were made originally by Anglo-Iranian for Banias and Tripoli crude but the company later cut to meet the 10-cent Jersey figure.

When the prices had leveled off, southern Iraqi crude loaded at Fao was left with a 5-cent lower price than the new prevailing Persian Gulf figure. This was a reflection of the fact that Fao is farther up the Persian Gulf, requires 2 more days sailing than Ras Tanura, and can only be reached by tankers of about 12,000 tons. This was a Socony-initiated differential and gave 36°-gravity crude at Fao a $1.92 quotation.

The three I.P.C. shareholders announcing a price for Qatar crude—Anglo-Iranian, Shell, and Socony—were 5 cents apart. Socony went up 25 cents for this 39°-gravity crude while Shell raised 30 cents to $2.11. Shell's action was interpreted as giving account to a higher quality of the Qatar crude. Anglo-Iranian raised to $2.08 for 40° gravity at Qatar, a 25-cent boost.

Need for adjustment . . . The rapid-fire succession of price changes in the Middle East and the apparent confusion which resulted came as the various selling companies maneuvered to avoid competitive disadvantages. The differing prices which the companies attempted to set was due in part to the fact that many of them sell to different destinations and different types of customers, some purely intercompany trade.

One result of the price changes was to lessen the differential between Ras Tanura and Sidon—in effect the pipeline charge—to 42 cents, which is the difference between $1.97 and $2.39. A 54-cent spread previously existed. Runs through the Trans-Arabian line have been cut to about 280,000 bbl. daily recently because it has been cheaper, under current low tanker rates, to pick up Arabian crude at Ras Tanura. The new 42-cent spread evens out the laid-down cost to European destinations, though still leaving a few cents advantage to Ras Tanura.

Dhofar Survey Completed

A preliminary geological reconnaissance of the province of Dhofar in the Sultanate of Muscat and Oman, southern Arabia, with a view of possible future oil exploration, was completed recently by a group representing Cities Service Co. and Richfield Oil Corp.

These companies hold an option on an oil concession covering the Province

of Dhofar, approximately 30,000 sq. miles, granted by Sultan Said bin Taimur of Muscat and Oman. It is planned to send a second geological party into the area early this fall.

The first group was headed by Frank Morgan, vice president of Richfield, and R. V. Whetsel, manager of the foreign department of Cities Service Petroleum, Inc.

EUROPE

New Cat on Stream

Esso operating fluid unit at Port Jerome refinery

ESSO STANDARD, S. A., Francaise has completed construction and begun operation of a new 10,000-bbl. fluid catalyst cracking unit at its Port Jerome refinery in Normandy, France.

Construction also is progressing on a new 25,000-bbl. two-stage distillation unit, which will boost capacity of the refinery early next year to about 70,000 bbl. daily.

Production of high-quality lubricating oils also will be increased, company officials told shareholders at the annual meeting in Paris, and a further expansion of crude capacity is forthcoming.

Distillation capacity of the plant is slated to be boosted to about 84,000 bbl. daily, by the end of next year, according to a report on European refinery expansion released in June by the Organization for European Economic Cooperation. This figure includes some cracking capacity which has been adapted for distillation. Reforming capacity at Port Jerome, OEEC said, will be about 26,000 bbl. daily, catalytic cracking capacity about 27,400 bbl. daily, and lube-production capacity about 12,000 bbl. daily by the end of 1954.

Reconstruction . . . Before World War II, the Port Jerome plant produced about 45 per cent of all lube oil manufactured in France. Loss of the dewaxing facilities, taken by the Germans during the occupation, dismantling of the vacuum rerun equipment, and bombing of the phenol-treating units left the lube-production potential greatly reduced at the time of the liberation *(The Oil and Gas Journal, January 14, 1952, page 76).*

By combining the undamaged parts of the two prewar phenol-treating units, one operable unit was reconstructed and extracted lube oils were produced from low-cold-test crude by December 1946. The phenol units were expanded and modernized in June 1949 when settlers were replaced by a modern treater tower. Lube output at that time was about 135 per cent of prewar production, but quality was limited by necessity of using low-cold-test distillates because of the lack of dewaxing facilities.

Engineering was begun in 1949 on propane dewaxing and propane deasphalting plants required to produce a full line of high-quality paraffinic lube oils. These units were placed on stream late in 1951.

Creole Erecting New Headquarters Building

Creole Petroleum Corp.'s huge office force in Caracas, Venezuela, now scattered in various locations over the city, will move into a new $7,500,000, 10-story building early in 1955. Initial planning for the project was begun about 5 years ago, but construction was put off until steel and other critical materials became more plentiful. The new building, shown in the above drawing as it will appear when completed, was designed by Lathrop Douglass, New York architect. Exterior walls will be of sheet aluminum backed by cellular steel panels. The structure will be erected on an east-west axis, with its east and west ends sealed against the sunlight. Protection from the sun on the broad north and south facades will be effected by overhanging visors. Plans for the structure also include special earthquake bracing, involving placement of the elevator core on the exterior of the building.

Llandarcy Progress

Anglo-Iranian continuing expansion at big refinery

ANGLO-IRANIAN OIL CO., LTD., has commissioned two more units at its Llandarcy, Wales, refinery in an expansion program which has been progressing steadily at the refinery since World War II.

The newest facilities to go on stream are a furfural unit and a gas-oil treating unit. Two more plants, a propane deasphalting unit and an MEK dewaxing unit, are slated to begin operations soon.

Plans also call for installation of a Platformer in 1955.

Capacity of the Llandarcy refinery now is about 80,000 bbl. daily. The original plant was built largely during World War I and completed in 1922 by National Oil Refineries, Ltd., a wholly owned subsidiary of Anglo-Iranian. Until World War II it had a capacity of about 7,000 bbl. daily.

The refinery was expanded by adding a 45,000-bbl. crude unit and stabilizer plant, completed in 1949 as the first major refinery unit to be finished in England after World War II.

Units completed last year under the current expansion program included a fluid catalytic cracking unit, a vacuum distillation unit, kerosine-extraction facilities, and a rerun unit. Also completed was the replacement of five timber jetties designed to handle 10,000-ton tankers with steel and concrete structures to handle tankers of the 28,000-ton class.

When the present expansion is completed, the refinery will supply about two-thirds of the electric power it will require from its own generating equipment. One big generator already has been commissioned and two more are nearing completion.

International Briefs

A new 19,900-ton tanker, the Saxonsky, has been launched at the Kockums yards of Malmoe. The vessel is owned by Niarchos Shipping Co., Athens. It is driven by a steam turbine, has a speed of more than 15 knots, and an over-all length of 556 ft.

The Italian Ministry of Industry and Commerce has decided to approve import of 3,250,000 tons of crude for processing in Italian refineries during the last 6 months of the year—a substantial boost over that permitted during the first 6 months. Supplies of products, however, are expected to remain tight because of government delay in granting permits for import facilities. Authorities now are at work on this problem.

PERSONALS

Research Chief

Socony's Nelson directs Paulsboro lab operations

THEODORE W. NELSON attributes his rapid rise in the research field to hard work rather than to flashes of genius.

However, in spite of his zeal for work the manager of the research and development laboratories of Socony-Vacuum Oil Co., Inc., Paulsboro, N. J., still finds time for sports. He bowls regularly and is a golf and fishing enthusiast.

He has been with Socony-Vacuum since his graduation from Colorado School of Mines in 1934. At that time he became a refinery engineer in Augusta, Kans.

In 1937 he was made a research engineer in the research and development laboratories in Paulsboro. Later he became a section leader in 1943, supervisor of the light-products division of the research and development department in 1944, director of the field-research laboratories, Dallas, in 1946, and associate director of Socony-Vacuum laboratories in 1952.

During World War II he served on several technical committees reporting to the Petroleum Administration for War on aviation gasoline, manufacture and supply.

While in Kansas Nelson met and married his wife. Two of his children, John, 13, and Barbara, 10, were born in New Jersey, and the other two, Paul, 5, and Susan, are native Texans.

He is a member of Tau Beta Pi, Sigma Alpha Epsilon, American Institute of Mining and Metallurgical Engineers, American Institute of Chemical Engineers, American Chemical Society, and American Geophysical Union.

SCHROEDER

Eric G. Schroeder has resigned as vice president in charge of operations for Lucey Products Corp. in Dallas to become an independent operator. He will remain as a company director and retain an office in Lucey Products headquarters in Dallas. **Randolph L. Griswold,** who has been Schroeder's assistant since 1947, has been named to succeed him.

August C. Long, president of The Texas Co., has been elected a director of Seaboard Oil Co. of Delaware, replacing **Col. Harry T. Klein,** who has resigned. Klein, formerly president of Texaco, had been a director of Seaboard since 1933.

Winston Glenn Smith, petroleum engineer for Tennessee Production Co., has been transferred from Houston to Victoria, Tex.

L. E. Bidwell, Jr., has been promoted from an engineering trainee for Sohio Petroleum Co. in Oklahoma City to engineer in Lafayette, La.

Harold N. Fisk, chief of the geologic research section of Humble Oil & Refining Co.'s exploration department in Houston, has been named to receive the James Laurie prize by the American Society of Civil Engineers. He will receive the prize for his technical paper, "Mississippi River Valley Geology Relation to River Regime." The award will be made during the society's national convention in New York October 19-24.

Joseph A. Dunphy, Jr., has been promoted from analytical chemist second-class to first-class in the control laboratory at the Bayonne, N. J., refinery of Tide Water Associated Oil Co.

John K. Scott, assistant project engineer in the engineering department of Tide Water Associated Oil Co.'s Bayonne, N. J., refinery, has been granted a military leave of absence and is working in the office of the assistant inspector of naval material in Indianapolis, Ind.

T. A. Mangelsdorf has been promoted from general superintendent of works for The Texas Co. installations to manager of the refining department's operations division. He will be transferred from Port Arthur, Tex., to New York, effective September 1.

Richard J. Wethern, formerly a process engineer for The Texas Co. in Lockport, Ill., is now working for a master's degree in chemical engineering at the University of Washington in Seattle.

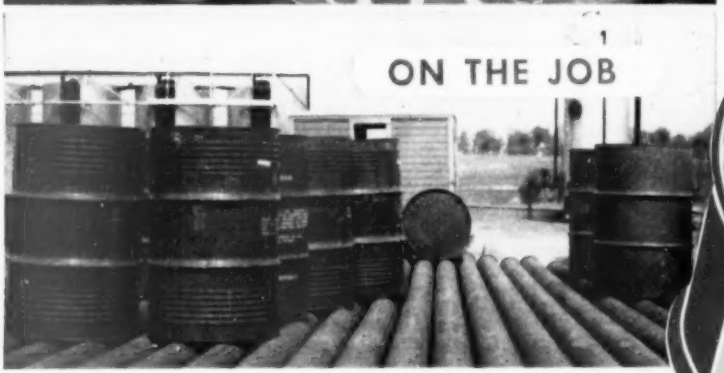
Roy F. Carlson has joined the Division of Production of the American Petroleum Institute in Dallas as assistant to the director. He will be in charge of the division's drilling and production practice programs, and district activities. He had been a member of the editorial staff of The Oil and Gas Journal since 1948, and his most recent position was as West Texas district editor.

Hubert E. Menger has been appointed vice president and manager of exploration for Monterey Exploration Co., San Antonio, Tex. He formerly was manager of exploration for Fred W. Shield, San Antonio independent. **Howard E. Davis,** formerly district geologist in Midland, Tex., for Honolulu Oil Corp., has been named district geologist for Monterey in Midland.

T. W. Bruckmiller, assistant general superintendent of the Standard Oil Co. (Ind.) refinery in Sugar Creek, Mo., has retired after 35 years' service.

Lee T. Meador has been appointed assistant traffic manager of Sun Oil Co.'s southwest production division. He succeeds **E. N. Earle** of Dallas, who retired recently after 28 years with the company.

John M. Beall, geologist for Shell Oil Co., has been transferred from Long Beach to Seattle. Other company transfers include: **Richard F. Boss,** junior geologist, from Casper to Salt Lake City; **Robert E. Chancellor,** paleontologist, from Houston to Grand Junction, Colo.; **James H. Elison,** geologist, from Bakersfield, Calif., to Seattle; **Richard J. Frost,** geologist, from Casper, Wyo., to Grand Junction; **Donald W. Gillespie,** from Sacramento,



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PERSONALS

Calif., to Seattle; **Henry T. Herlyn,** junior geologist, from Long Beach to Seattle; **George Herman,** geologist, from Casper to Salt Lake City; **Joseph A. Johnson,** geologist, from Ely, Calif., to Seattle; **William S. Johnson,** junior geologist, from Bakersfield to Seattle; **Stewart M. Jones,** geologist, from Tucson, Ariz., to Seattle; **James E. Kennell,** geologist, from Sacramento to Seattle; **Joseph H. Merrow,** geologist, from Salt Lake City to Seattle; **Cornelius M. Molenaar,** junior geologist, from Ely to Seattle; **Donald A. Preston,** geologist, from Long Beach to Seattle; and **Theodore J. Zagurski,** geologist, from Casper to Billings, Mont.

Paul A. Wade, corrosion engineer for Tennessee Gas Transmission Co. in Jackson, Tenn., has been transferred to Houston as an engineer.

George R. L. Shepherd has been appointed senior research chemist of the research and development division at Humble Oil & Refining Co.'s Baytown, Tex., refinery. His duties will include assignments ranging from fundamental study of catalytic conversion processes to the preparation of economics for proposed new processes. **Jack W. Smalling** has been promoted to assistant general foreman of light ends at the Baytown refinery. He was a member of the technical service division prior to his transfer into operations. New additions to the refinery staff include: **Adrian D. Bloch, Jr., James D. Tatum,** and **William R. Taylor,** to the maintenance department of the engineering division; **Delos E. Brown,** and **Thomas S. Farmer,** to the research and development division; and **Ronald L. Anderson, William H. Dickerson, J. Irwin Jordan, Jr.,** and **Robert L. Seldomridge,** to the technical service division. **Thomas H. Royder** has been reemployed on the technical service division's staff after almost 2 years Army service.

G. Roy Brotherhood has been appointed vice president and manager of operations for Canpet Exploration Ltd. in Calgary, Alta. Canpet is a recently formed subsidiary of Caracas Petroléum S.A. Brotherhood joined Caracas Petroleum in Venezuela in 1939 and spent 3 years in Trinidad during World War II. He is a native of England and received a physics degree from London University, where he later did postgraduate work in geology and geophysics.

LaFortune Honored at Luncheon

Joseph A. LaFortune (third from left), recently appointed deputy administrator of the Petroleum Administration for Defense, is shown as he was honored at a luncheon given in New York recently by Walter S. Hallanan, chairman of the National Petroleum Council. Left to right are R. Rae Jackson, assistant deputy administrator of PAD; H. P. Reynolds, assistant deputy administrator and general counsel for the agency; LaFortune; and Hallanan. Top executives in the oil industry in the New York area who are members of the NPC attended the luncheon.

William A. Cecil has been appointed Kansas manager for Aurora Gasoline Co. He formerly was district manager for Aurora in Evansville, Ind., and has been with the company 6 years.

OLEN LANE

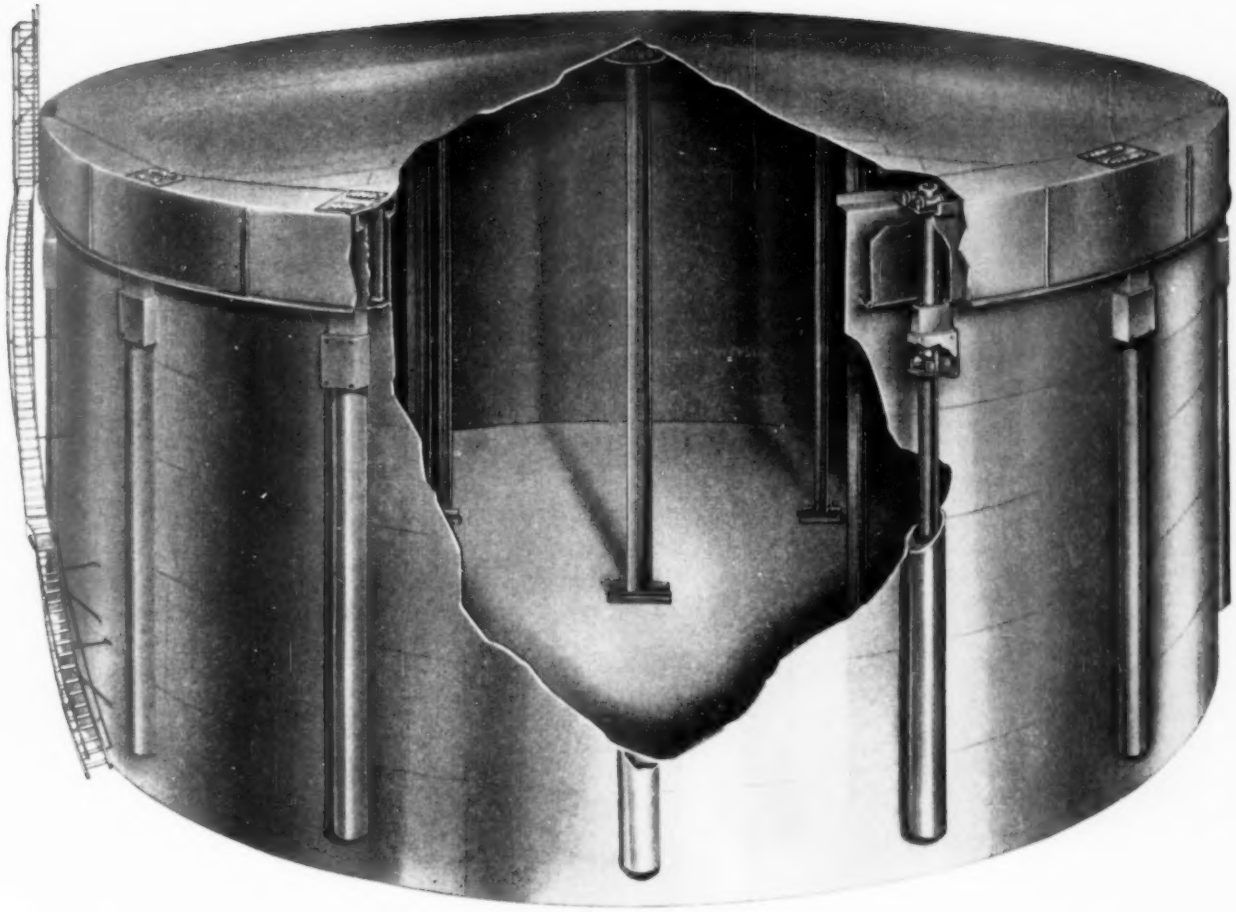
Olen Lane, of Los Angeles, western region general manager for Continental Oil Co., has been elected a vice president of the company. He will continue to serve as western region general manager. Lane joined Continental in 1920 at Ponca City, Okla., and transferred to Los Angeles in 1923 as a landman. He was named western region exploration manager in 1950, and later that year was named assistant general manager. He was appointed general manager in March this year.

John O. Galloway, geological consultant, has been elected president of the Calgary Petroleum Club in Alberta for 1953-54. Other officers elected were: **R. H. C. Harrison,** president of Canadian Petroleums Association, and **F. G. Graves,** Clarkson Gordon & Co., secretary. New members of the board of governors are: **J. M. Cairns, H. J. Forester,** Harry Forester's Ltd.; **H. F. Herron,** Okalta Oils Ltd.; **W. A. Hyndman,** The Royal Bank of Canada; **G. L. McMahon,** Pacific Petroleums Ltd.; **Vernon Taylor,** Imperial Oil Ltd.; and **Ralph Hill,** R. W. Development Co., Ltd.

R. A. Bishop, manager of exploration for Sohio Petroleum Co. in Regina, Sask., has been transferred to Billings, Mont., as chief geologist. **Walter McCloy** has been transferred from Oklahoma City to Regina as superintendent of operations.

L. E. Ash has been appointed general construction superintendent of the refinery division of Macco Corp., Paramount, Calif. For the past 6 years he has been construction superintendent for Foster Wheeler Corp., where he handled projects in oil and chemical fields.

Stuart A. Levinson has been named temporary chairman of a steering committee in Houston formed to establish a Gulf Coast section of the Society of Economic Palcontologists and Mineralogists. Other officers include: **Charles W. Stuckey** and **Fred L. Smith, Jr.,** vice chairmen; **Jack O. Colle,** secretary; **Frank V. Stevenson,** treasurer; and **Morton B. Stephenson,** vice treasurer. Primary objective of the section is to promote the science of stra-



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Concerned about excessive loss of product, due to evaporation? Forget it! With Bethlehem's new lifter roof, evaporation losses are reduced to the minimum, because the air-vapor is kept under control at all times.

The Bethlehem Lifter Roof is a single-lift, roller-guided gas holder, forming an integral part of the storage tank. The specially designed cone-type roof moves upward or downward as the air-vapor expands and contracts, to provide additional storage space for the vapor. The guides are within the roof, and are unaffected by the formation of ice.

The roof has a dip ring and weather hood, both outside the tank shell. The dip ring operates in a circumferential trough at the top of the shell. The weather hood keeps dirt, rain and snow out of the circumferential trough.

Vertical stiffeners, located outside the tank shell, provide strength and rigidity, and also act as collecting reservoirs for any condensate which may form in the sealing trough.

Additional information about the operating and construction features of the Bethlehem Lifter Roof may be obtained from the nearest Bethlehem office.

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PERSONALS

tigraphy in the Gulf Coastal states by stimulating research in paleontology and sedimentary petrology.

Walter A. Shulaw, formerly a geological engineer for Dee Miller Drilling Co. in Lawrenceville, Ill., has been named a petroleum engineer for Magnolia Petroleum Co. in Falfurrias, Tex.

R. C. Alden, chairman of the research planning board of Phillips Petroleum Co.'s research and development department, has been elected vice chairman of the technical committee D-2 on petroleum products and lubricants of the American Society for Testing Materials. Purpose of the committee is to promote standardization in materials testing, specifications, and nomenclature for petroleum products and lubricants.

William D. Wood has been appointed a petroleum engineer for Socony-Vacuum Oil Co., Inc., in Caracas, Venezuela. He formerly was a petroleum engineer for Ohio Oil Co. in Hobbs, N. M.

Liston F. Hills has been appointed to the newly created post of engineering coordinator for Arabian American Oil Co. with headquarters in Dhahran, Saudi Arabia. Hills has been assistant manager of the construction department, general offices, of the company. In his new post, he will work under **J. C. Stirton,** vice president, and will be responsible for coordinating the work of all Aramco engineering personnel.

Joseph J. Mulvey has joined Oil Advisors, Inc., New York petroleum consultants. He recently retired as fuel-oil sales manager for Atlantic Refining Co. He had been with Atlantic 43 years.

F. S. Wood has been promoted to section leader in the automotive division of the Whiting, Ind., research laboratories of Standard Oil Co. (Ind.) He joined Standard in 1944 as an automotive engineer and was advanced to group leader in 1947. **C. C. Colyer** and **W. H. Shimmin** has been appointed group leaders in the same division. Colyer has been with the company since 1947 and Shimmin since 1950.

F. M. Clingman, tool pusher for B.B.M. Drilling Co., has been transferred from Tatum, N. M., to Crane, Tex.

David T. Staples, president of Tide Water Associated Oil Co., has been named a director of Western Oil and Gas Association.

Fred D. Spindle, geologist for Ohio Oil Co., has been transferred to Holyoke, Colo.

G. H. Gebhart, tool pusher for Peak Drilling Co., has been transferred from Rock Springs to Cody, Wyo.

James A. Bowman and **Gordon D. Kerns** have joined the staff of the Whiting, Ind., research laboratories of Standard Oil Co. (Ind.). Bowman formerly was associated with Magnolia Petroleum Co. in Dallas and holds a Ph.D. degree in chemistry from Northwestern University. Kerns, who has a master's degree from the University of Minnesota, previously was with Sun Oil Co. in Marcus Hook, Pa.

R. A. Broomfield, Jr., consulting geologist, has moved his offices from Artesia, N. M., to Bartlesville, Okla.

Earl W. Unruh, chief general engineer for Sinclair Pipe Line Co., Independence, Kans., has been promoted to part-interest executive. He will be in charge of Sinclair Pipe Line's interests in numerous joint ventures and part-interest pipe-line systems in which it participates. **Watt H. McBrayer,** formerly counsel for the company, has been named assistant to the president in the executive department. **Angus A. Davidson,** associate counsel and part-interest executive, has been named counsel in charge of the company's legal department.

A. H. Norton has been elected president of McDougall-Segur Exploration Co. of Canada, Ltd. Norton is a consulting geologist. New board members include **J. B. Cotsworth, W. E. Allan,** and **W. Bruce Kippen.**

Charles A. Herster has returned to Phillips Petroleum Co. as a design engineer in Sweeny, Tex., after a leave of absence to pursue studies at Cornell University, Ithaca, N. Y.

Allen C. Hutcheson has been named secretary and **Raynor F. Sturgis, Jr.,** has been named treasurer of Pure Oil Co. They will succeed **Clarence H. Jay,** who will retire November 1. Hutcheson has been with the company more than 13 years and Sturgis has been assistant secretary and assistant treasurer.

O. B. Lloyd, Ponca City, Okla., has been promoted from general sales manager of Continental Oil Co.'s marketing department to executive assistant to the vice president of marketing. He will continue to make his headquarters in Ponca City. **S. D. Breitweiser,** New York City, acting general manager of the eastern region, has been named general sales manager with headquarters in Ponca City, succeeding Lloyd. Lloyd joined the company in 1921, and Breitweiser came to the firm in 1932.

DEATHS

Eugene W. Pembleton, 59, Richmond division manager for Cities Service Oil Co. (Pa.) died July 22 at his home in Richmond, Va. Pembleton, who had been with Cities Service since 1916, previously was manager of the upper New York state division.

H. M. Reigle, 80, Fort Worth, died July 24. With the late C. S. Richmond he formed Richmond Drilling Co. in 1915. His first oil-field experience was on the Boggs and Rosenberg lease near Corduroy, Pa., in 1891. He had lived in Fort Worth 27 years.

Burrill Ennis, 54, general manager of asphalt sales for Sinclair Oil & Refining Co. in Kansas City, died July 19 in Kansas City. He formerly was an asphalt engineer for Derby Oil Co. and Wood River Oil Co. in Wichita.

Francis J. Colton, 55, an executive in the natural-gas department of Associated Oil Co., died July 21 in Los Angeles. He was past president of the Natural Gasoline Association of California.

William H. Osterhout, 76, retired oil driller, died in Tulsa July 29. He lived in Independence, Kans., 52 years before coming to Tulsa last May. He retired about 12 years ago.

Peter Finkler, 96, retired oil operator, died July 27 in his home in Wichita. He was a native of Pennsylvania and began his oil career in the fields there.

J. Paul Miller, 40, manager of the office services division of Atlantic Refining Co., died July 20 in Philadelphia.

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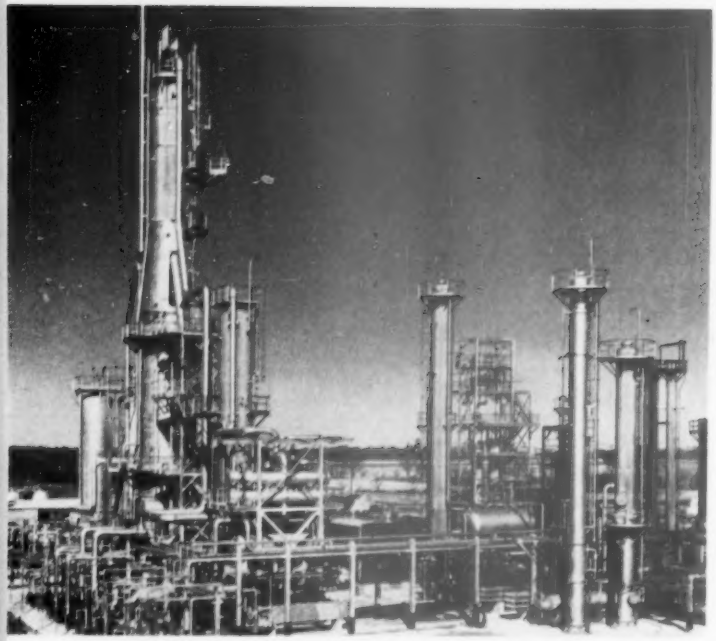
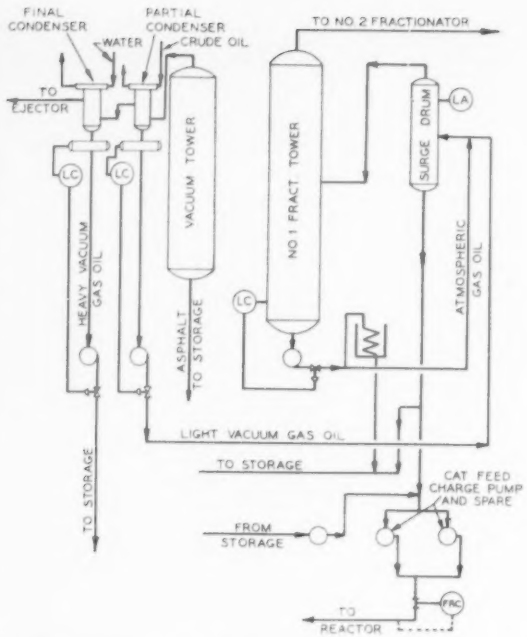


Modernization of the El Dorado Refining Co. plant included installation of a 4,300-bbl. per day U.O.P. fluid catalytic cracking unit.



Existing equipment was utilized for the cat feed-preparation unit. Fig. 1.

New Facilities Boost Yield, Improve Quality

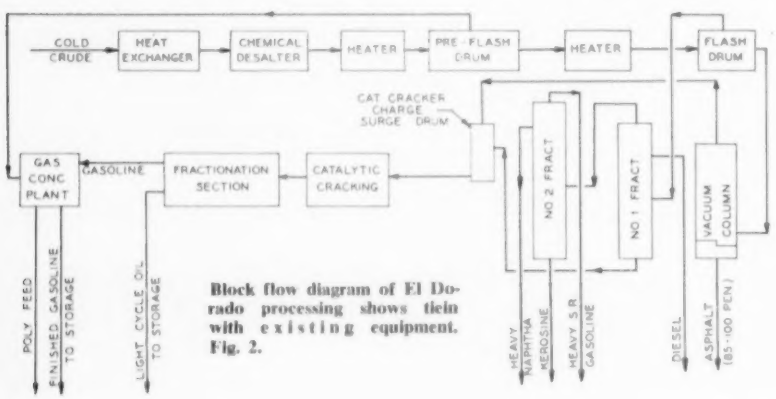
El Dorado refinery modernizes to meet competition

by John C. Reidel

INSTALLATION of a catalytic cracking unit at the El Dorado, Kans., refinery of El Dorado Refining Co. was primarily prompted by the need to manufacture gasoline of octane number that would be competitive in current operations. Contributing factors were to obtain an increased yield of gasoline with over-all increase in refinery capacity and to reduce the yield of residual fuel oil.

With addition of the new 4,300-bbl. per day U.O.P. fluid catalytic cracking unit and gas-concentration plant and modifications of the existing crude and vacuum - distillation units, operations have been expanded to a crude throughput capacity of 12,000 bbl. per day, at which figure the refinery is currently operating. Before this latest expansion, El Dorado operated on a crude topping-thermal cracking basis at an average rate of 7,500 bbl. per day in 1952. Average runs in 1951 were at the rate of 7,250 bbl. daily.

Contract for construction of the new facilities was with Refinery Engineering Co., Tulsa. Cat cracker and associated facilities were built in 13 months from drawing board to initial operation. The modernized plant went on stream in January 1953. New storage facilities, from crude oil through finished products, have been provided.



Block flow diagram of El Dorado processing shows tieln with existing equipment. Fig. 2.

Former operation . . . The refinery charges typical western Kansas crude oil, of 37° A.P.I. and low sulfur content. Previous operation consisted of topping, thermal cracking with a Winkler-Koch still, and catalytic polymerization. With this operation it was necessary to buy outside blending stock and cut end points in order to make octane number.

Equipment revamp . . . Process flow was altered by separating the topping unit from the thermal cracker service. An existing heater, formerly in cracking service, is employed for heating

crude oil to this topping unit which is now operated in series with another fractionator as indicated in Fig. 1. The No. 1 and No. 2 fractionators were existing crude-distillation equipment.

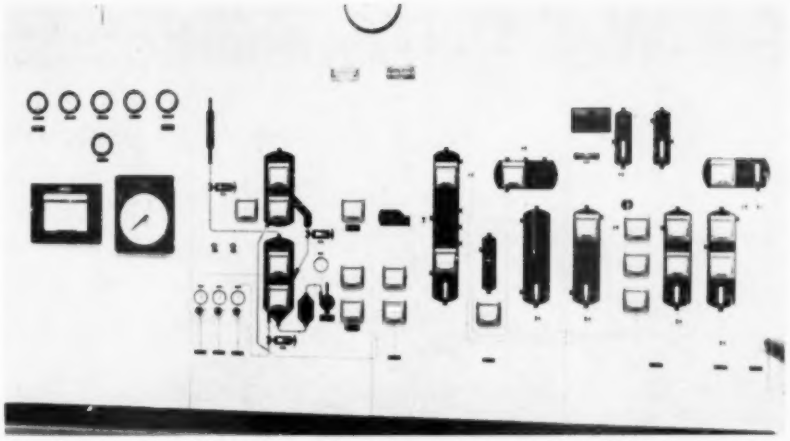
The vacuum tower, also part of the former thermal cracking operation, was taken out of this service. Virgin topped crude is now charged to this tower to make cat cracker feed and negative Oliensis test asphalt. The upper portion of the vacuum tower is equipped with sloping side-to-side pans. It was necessary to install a false bottom in this vessel to insure sufficient available N.P.S.H. when pumping 80-penetration asphalt. Storage and blending facilities were added for manufacture of a full range of asphaltic materials. Vacuum-tower overhead goes through partial and final condensers to make light and heavy vacuum gas oil for cat cracker feed.

The existing poly unit was revamped for a U.O.P. nonselective operation to handle the light gases from cat cracking at a rate of 1,300 bbl. per day. The thermal cracking unit was also revised to handle a smaller flow and to crack recycle oil from the cat unit during those periods when it cannot be sold directly in No. 2 fuel oil. Alternatively, the thermal unit can be used as a naphtha reformer.

The cat gasoline octane number is 92 clear. The average amount of lead used to blend all gasolines up to its respective specification is 1.5 ml. per gallon. The housebrand specification is 83.5, premium is 90.0.

The net and desired results from the revamped and new facilities was a 12 per cent gain in the quantity of gasoline and a 14 per cent reduction in residuals.

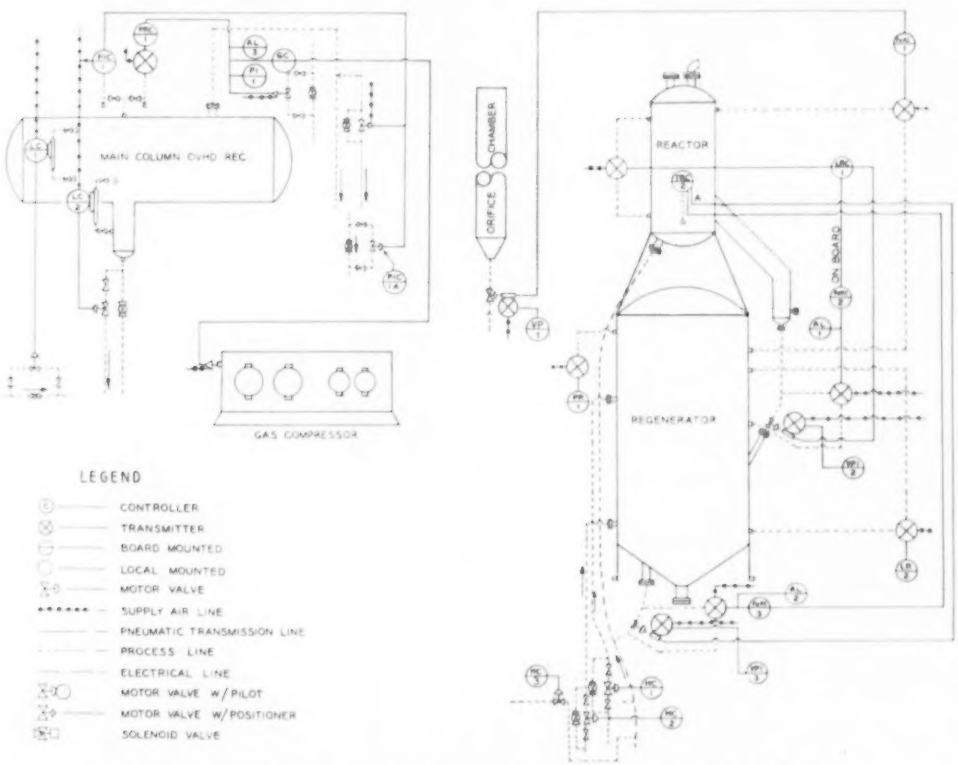
A new water-treating plant was installed and a 5,000-gal. cooling tower to serve the catalytic cracking unit, the gas-concentration section, and part of the polymerization unit.



Cat cracker graphic panel. Valve position indicators on board show position of slide valves.

Feed preparation . . . The old No. 2 vapor separator is now employed as the feed surge drum for the cat cracker. Atmospheric gas oil and vacuum gas oil from the partial condenser of the vacuum unit form the principal sources of feed to the surge drum. Fig. 2 shows tiein of existing facilities to provide cat feed.

In this scheme, additional cat feed stock, including vacuum gas oil from the final condenser of the vacuum column, goes to storage. This supplementary feed is moved as required by a transfer pump from a storage charge tank and discharged into the suction of the charge pumps. A liquid-level controller on the cat feed charge drum is used to throttle the transfer-pump discharge so that any requirements for feed above that produced by the crude units is made up automatically from storage. The three pumps involved in movement of cat feed stock are manifolded so that a spare pump is always available. High level is maintained in the feed surge drum to insure meeting required N. P. S. H. of the charge pumps.



Principal instrumentation for cat cracker. A 13-point alarm system is included. Fig. 3.

Catalytic Cracking Facilities

The U. O. P. catalytic cracking unit was designed for a charge capacity of 4,300 bbl. per day at 75 per cent conversion. Coke-burning capacity is 5,100 lb. per hour.

(Cont. on page 85)

Gas-Well Deliverabilities Stepped Up

. . . by new high-pressure acidization techniques

by Joseph A. Kornfeld
District Editor

La Gloria Corp. restores plugged bore-hole permeability by slugging mud acid with stream of high-pressure gas; large gains made in both productivity and injectivity.

INTERMITTENT slugging of mud acid with high-pressure gas has resulted in very large increases in open-flow potentials of gas wells recently reworked in La Gloria field of South Texas. Where formation permeability has been sharply reduced at the well bore by infiltration of mud and formation water during original drilling, difficulty has been noted in the past in treatment with conventional methods. One well's open-flow potential was increased to 85 million cubic feet per day from 25 million cubic feet by the new method.

Injectivity of gas wells has been improved materially through another application of this technique for treatment of wells completed **below** the gas-water contact. This technique introduces gas under high pressure **ahead** of the acid to prevent dilution. Then the acid-slugging procedure follows. Displacement after intermittent slugging is made with a continuous stream of high-pressure gas but the well is not backflowed. Not only did this application boost injectivity of a particular well to 19 million cubic feet per day from 2 million cubic feet, but wellhead pressures required for injection dropped from 3,000 psig. to 2,850 psig. after treatment.

Compressor-horsepower requirements for injection are also lowered by use of this new method. Similarly, broad use of this technique in large reservoirs minimizes the number of injection wells required for a cycling or pressure-maintenance program.

Gas-Well Treatment

In order to maintain contractual delivery requirements from a given gas field, the following methods can be utilized: Drilling of new wells; recompletion of wells in other pay zones; or improvement of open-flow potential of wells in the same sand. The last method, discussed in this article, requires the least expenditure of the several methods.

Plugging effects . . . Justice and Neilsen[1] have studied bore-hole plugging effects caused by inflitration of drilling mud and water into shallow gas sands on a number of field wells completed in deeper gas zones in La Gloria field.

Infiltration during original drilling operations developed an impermeable zone around the well bore at the sand face of each of a number of Frio gas sand reservoirs reducing sharply the sand-face permeability. The net effect was a sharp drop in productivity when wells were plugged back from deep depleted gas zones to recomplete from shallower gas zones behind the pipe.

This condition was brought strikingly to the attention of these engineers when recompletions from major gas zones restored by 8 years of cycling failed to equal the average original open-flow potentials.

Mud-acidizing objectives . . . Acidization programs employed during the past 3 years in this field by La Gloria Corp. and the La Gloria Operators Committee were aimed at restoration of the original sand-face permeability. Removal of the drilling mud and extraneous material from the immediate radius of the well bore was the engineers' target.

Where the permeability of the sand face has been reduced markedly by the effect of drilling-mud infiltration, it has been most difficult to acidize gas wells by conventional treating methods.

Various methods of displacing the acid were tried without obtaining significant improvement in permeability. Water was used as a displacing medium on several applications behind single-stage applications of 5,000 gal. of mud acid without extraordinary success. Later, distillate was employed as the displacing medium but the expected increase in open-flow potential was not obtained.

Plugging and Productivity

Muskat[2] has shown that in uniformly permeable and porous formations, a zone of partial plugging 1 ft. in radius around the well would drastically decrease the productivity of the well. The analysis for this problem shows that the productive capacity of a well is very sensitive to the value of the per-

The Problem . . .

Infiltration of mud and water during original drilling of shallow gas sands plugged bore hole; when these sands were exposed by perforations during later life, productivity did not approach normal potentials obtained by original wells. How to get a normal potential by workover is the problem.

The Procedure . . .

For producing well: Inject acid in tubing in small 10-bbl. slugs, separated by small volumes of high-pressure gas until 4,000 gal. of acid is placed in formation; flow well to atmosphere through large choke.

For injection well: Inject gas under high pressure ahead of acid to prevent dilution from aquifer and follow with above acid-treating procedure; do not backflow.

The results:

La Gloria field case histories:

	Producing well	Injection well
Before treatment, cu. ft. per day	25,000,000	2,000,000
After treatment, cu. ft. per day	85,000,000	19,000,000

meability of the zone immediately surrounding the well bore. This is to be expected in view of the highly localized character of the pressure drop in a radial-flow system around the well center.

Reduction of deliverability is not proportional to the thickness of the mud-affected zone since the major portion of deliverability reduction is caused by plugging of the area immediately adjacent to the well bore. An additional increase in the thickness of the mud-affected zone causes successively smaller reductions in well deliverability.

Permeability Restoration Effects

The major portion of the increase in productive capacity resulting from an acid treatment is due to the restoration of the permeability of the mud-affected zone to the permeability average of the main reservoir. For example, if the mud-affected zone has a radius of 1 ft. and a permeability of 10 per cent of the original permeability of the main reservoir, and this zone is restored by acid treatment so that it has the permeability of the main reservoir, the productive capacity is increased 180 per cent. See Fig. 1.

Any increase in the permeability of the mud-affected zone or of the new few feet of the reservoir above the permeability of the remainder of the reservoir does not increase appreciably the deliverability of the well. For example, if the permeability of this 1-ft. zone is increased to 400 per cent more than the original reservoir permeability, the productivity capacity of the well would be only 14 per cent more than the productive capacity of the well with a 1-ft. radius zone having the same permeability as the remainder of the reservoir. See Fig. 2.

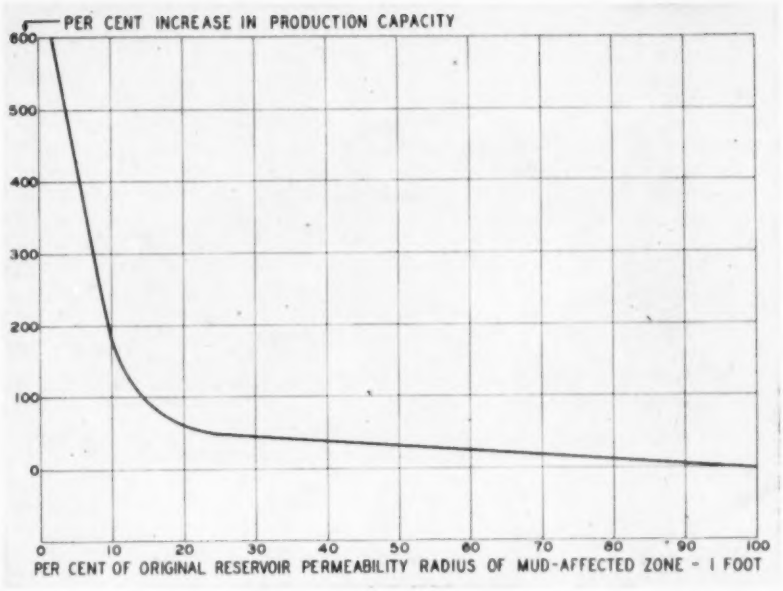


Fig. 1—Restoration of permeability by acid treating a reservoir partially plugged by mud.

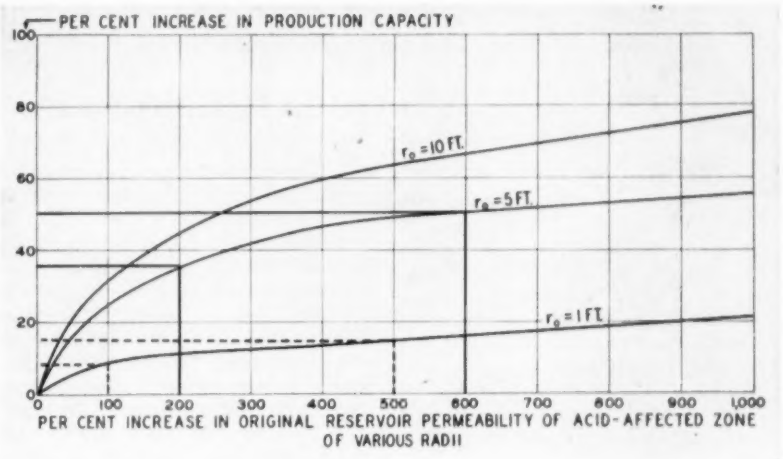


Fig. 2—Increase in production capacity of a reservoir of uniform permeability due to acid treatment.

Acid's function . . . The principal function of the acid is to restore the original permeability of the mud-affected zone. Thus, if we dissolve a cavity around the well bore 1 ft. in radius, the deliverability would be increased only about 20 per cent. Objective of the acidizing program is to remove mud and extraneous material (which were introduced during the original drilling operation) from the well-bore region so that the original permeability of the formation could perform its function in flow mechanism.

Critical first foot . . . Experience has proved that permeability improvement around the critical first-foot radius was related to the rapidity with which acid was removed from the sand face. If the acid was allowed to remain within the formation and thus become completely neutralized, its effectiveness would be lost within the first-foot radius.

Procedure Employed

Well-treating procedure employed in high-pressure gas slugging of mud acid is as follows:

1. Introduce a slug of 10 bbl. of mud acid into tubing. (Initial pumping rate: 2.5 bbl. per minute; initial pumping pressure 2,370 psig.).
2. Follow with high-pressure gas stream.
3. Pump in another slug of 10 bbl. of mud acid.
4. Pump in acid and gas alternately until tubing is filled.
5. Continue to pump in acid until a formation breakdown is obtained.
6. Resume injection of high-pressure gas.
7. Repeat previous cycle of steps 1, 2, 3, and 4, until a total of 4,000 gal. of acid has been placed within the formation.
8. Displace intermittently slugged acid with a continuous stream of high-pressure gas.
9. Flow well to atmosphere using a ⅜ to ½-in. choke.

Procedure Analyzed

Consider the average depth of casing perforations as being 6,725 ft. Pressure of a hydrostatic head of solid column of acid to that depth (from derrick-floor) is 3,130 psig.; this value is 380 psi. greater than the reservoir pressure of 2,750 psig.

Acid recovered fast . . . Injection of the

(Continued on page 90)

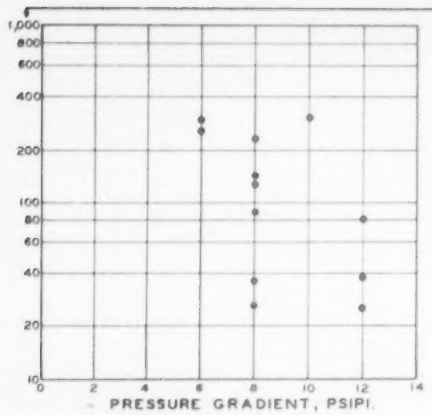


Fig. 1—Field A. Pressure gradient required to restore permeability to oil in fresh-water-damaged sands.

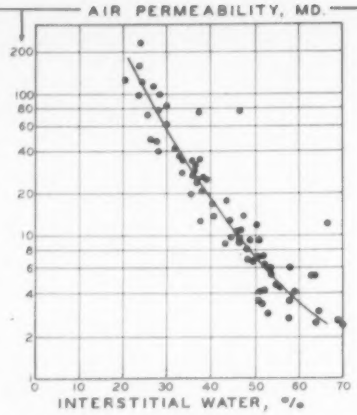


Fig. 2—Field C. Interstitial water content, by capillary method.

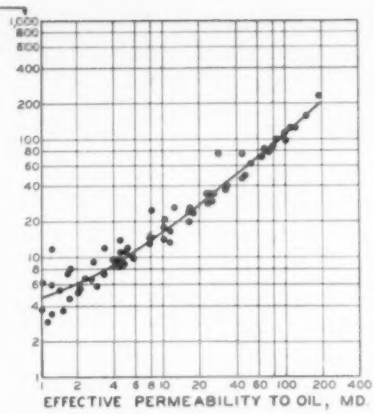


Fig. 3—Field C. Effective permeability to oil in presence of interstitial water.

Water Damage to Oil-Well Productivity

Studies here reported reveal that oil permeabilities and saturations with water-flooded sands can be restored and water damage greatly reduced

by T. A. Bertness*

STUDIES to determine the extent of damage to oil-well productivity have shown:

- Water sensitivity of an oil formation does not directly indicate the effect of water on oil productivity.
- The oil productivity of some consolidated water-sensitive oil sands can be restored by flow of oil after invasion of water. The ability to overcome the water damage appears related to the drawdown available for the flow of oil.
- The permeability to reservoir water may not be indicative of the effective oil permeability in the reservoir. Reservoir water permeability should not be considered as a reference for relative permeability calculations. Instead, it is suggested that specific permeability or effective permeability to oil in the presence of interstitial water be regarded as reference values for relative permeability calculations.

Water damage . . . It is generally recognized that the productivity of many reservoir sands may be damaged by exposure of the sands to water. However, it has been difficult to relate the extent of such damage to the physical properties of the sands. Core analyses have often included measurements of permeabilities to brines and fresh water, and these measurements have been regarded as indicative of flow behavior in the reservoir.

Oil sands thought to be susceptible to water damage have been described as water-sensitive, and water sensitivity has been measured by the reduction in water permeability which occurs when a sand containing reservoir water is exposed to fresh water.[1,2] Core analyses have shown that water sensitivity varies from zone to zone and in degree from almost complete reduction of water permeability to one of negligible effect. However, few laboratory and field data have been presented to show whether any correlation exists between water sensitivity thus measured and the effect of water upon oil productivity.

Stevens Zone Cores, Field A

The cores selected for the first laboratory studies were from the Stevens zone which is composed of sands with a high clay content. The reservoir water permeabilities of these "dirty" sands are severely reduced if the sands are exposed to fresh water. The sands are, therefore, regarded as highly water sensitive.

Cores were prepared with oil and interstitial water contents believed to be representative of the saturations of the sands within the reservoir. The procedures used were the "restored state" or capillary pressure methods.[3] The capacities of the sands to conduct oil under these conditions were measured. These permeabilities represent the maximum effective oil permeabilities that would exist in the reservoir.

The core samples were then flooded with fresh water and allowed to stand for 64 hours in contact with fresh water. Although the effective permeabilities to oil were low at first, it was found that the original capacity to conduct oil was restored within a day's time by flow of oil at pressure gradients across the cores below 12 psi. per inch.

It is noted from the data presented in Fig. 1 that the sands examined exhibited varying degrees of resistance to the recovery of the original effective oil permeability. However, with the application of sufficient pressure gradient, the effective oil permeabilities of the water damaged sands were restored.

The studies of the sands of field A were conducted with core samples whose original fluid content had been extracted in the laboratory. It was questioned whether the cleaning process had affected the sample's reaction to water. To answer this question an additional study was conducted with a group of oil base cores from the Stevens zone in field B.

Stevens Zone Cores, Field B

Samples of the oil base cores were prepared for study of flow behavior without cleaning and extracting the

*General Petroleum Corp. Paper presented at spring meeting, Pacific Coast District, division of production, A.P.I., Los Angeles, June 1953.

original liquids of the cores. The free gas present in the cores as received at the laboratory was substantially replaced by oil in the following manner: Propane was passed through the core samples to displace the gas present, and was followed by a flow of oil which absorbed the propane remaining in the cores.

Core analyses of adjacent samples indicated that the water content of the oil-base cores as received in the laboratory was not disturbed by this process.

The effective oil permeabilities were measured, and a few pore volumes of fresh water were forced through the cores. The samples were then immersed in fresh water for a day's time. The effective oil permeabilities were again observed, and it was found that the flow of oil at moderate pressure differentials followed by capillary displacement with oil at 16 psi. recovered an average of 85 per cent of the original effective oil permeabilites.

To check the reliability of the initial measurements of effective oil permeabilities, the cores were cleaned and saturated with interstitial water and oil by capillary displacement techniques. Oil permeabilities in the presence of interstitial water corresponded closely to the values obtained prior to cleaning the cores. The data obtained indicate that the cleaning procedures employed did not affect the flow behavior of the cores.

Cores from Field C

With the development of a small field C over the past few years, considerable field and laboratory evidence have been obtained which indicate that satisfactory oil productivity can be established in water sensitive oil sands containing relatively fresh water. The salinity of the water native to the reservoir is approximately 125 grains per gallon Cl^-. Permeabilities to water of this salinity were observed in the analysis of all core samples from the field, and the data obtained indicate that the productive intervals throughout the field generally have very low permeabilities to reservoir water.

Field evidence of this behavior was first obtained in a stepout well which cut the water table. The oil productive interval at this location appeared marginal and wet with possible oil production in the upper 15 ft. This interval was held open and numerous swabbing attempts were made over a period of 2 months. However, only small amounts of water with a little oil were obtained. Eight days after the well was last swabbed to bottom, a depth-pressure test was run. The gage indicated that equilibrium static pressure had not yet been attained due to the extremely low gross productivity index. At this time productive wells in the remainder of the field were flowing 45° A.P.I. oil from sands of similar permeability characteristics. However, at the edge well location the sands proved to be wet and to have a negligible productivity.

Core analysis of 173 samples of oil sands from the production interval (16 to 30 ft. net oil sand) of 11 wells provided the following average properties of the zone.

Permeabilities, md.			Interstitial water content—per cent pore volume
To air	To oil with interstitial water	To reservoir water	
51	39	8	32

Restored state studies were conducted with the cores initially saturated with synthetic reservoir water of chloride salinity (125 g.p.g.), which approximates the salinity within the reservoir. Water was displaced from the cores with kerosine at a capillary pressure of 16 psi. The viscosity ratios of the oil and water used in the laboratory approximated the viscosity ratios in the reservoir. The data obtained by these studies are presented in Figs. 2 and 3.

Studies of the effect of salinity upon water permeability gave the average behavior illustrated in Fig. 4. Permeabilities to synthetic reservoir water were measured on all cores. The data obtained are presented in Table 1. It is noted that the majority of the cores with high permeabilities to the reservoir water were from a relatively clean streak of sand found near the center of the field.

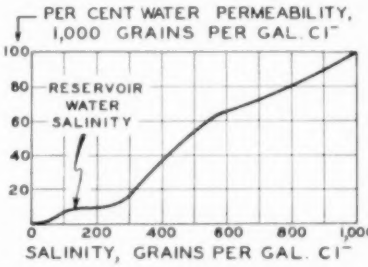


Fig. 4—Field C. Effect of salinity upon water permeability.

TABLE 1—RELATIONSHIP OF RESERVOIR WATER AND AIR PERMEABILITY

Per cent of core samples	Permeability to reservoir water
36	less than 0.1 md.
21	1 to 10 per cent of air permeability
30	10 to 50 per cent of air permeability
13	50 to 60 per cent of air permeability

Calculations of completion effectiveness as described by Wade[4] were prepared for all the wells cored. The reservoir oil was initially undersaturated and produced with bottom-hole pressures above the bubble point. Therefore, the effective oil permeabilities in the reservoir were assumed to be the same as those observed in the laboratory with interstitial water in place (by capillary pressure techniques). The completion effectiveness factors calculated in this manner ranged from 0.11 to 0.50 with an average of 0.27. These values are consistent with experienced oil productivity from sands of similar air permeabilities that are not water sensitive. Thus, field evidence indicates that a satisfactory oil productivity can be established in oil sands which have small or negligible permeabilities to water in the reservoir.

Cores From Field D

Production history of field D has added further information regarding the effect of water on the oil productivity of water sensitive oil sands. As water cuts developed in the production and bottom-hole pressures dropped below the bubble point, it was noted that the measured productivities during subsurface pressure-flow rate tests dropped substantially below the observed productivities prior to these tests. It was concluded that when the pumps were pulled, water standing in the tubing was forced into the oil sands and produced an immediate detrimental effect on gross productivity.

Production rates following the subsurface pressure tests gradually increased to values produced prior to the water damage. Thus the water damage appeared to be only temporary. However, as reservoir pressures declined, the complete recovery of oil productivity became more difficult to obtain under the drawdown available to flow of oil from the reservoir. This behavior is illustrated by the production histories presented in Fig. 5.

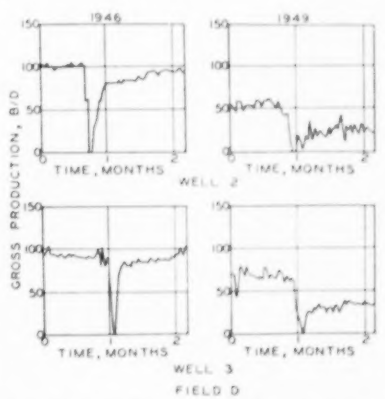


Fig. 5—Field D. Production history of wells exposed to water in well bore.

TABLE 2—PRODUCTIVITY INDEXES INFERRED FROM PRODUCTION HISTORY AND AS CALCULATED FROM WELL TEST DATA

(The producing intervals were exposed to produced water immediately preceding well tests. Wells were cutting 4 to 8 per cent.)

		Test data		Inferred productivity index before test		
Date	Well	Rate during test, bbl. per day	Observed P.I.	Rate before test, bbl. per day	Producing pressure at pump	Inferred productivity index
1946	1	41	0.21	64	235	0.33
1947	1	11	0.05	14	100	0.28
1946	2	76	0.21	100	370	0.41
1947	2	21	0.12	92	210	0.80
1949	2	18	0.07	110	200	0.41
1946	3	70	0.23	92	370	0.40
1947	3	45	0.18	65	170	0.31
1948	3	31	0.15	67	300	0.59
1947	4	105	0.26	142	340	0.47
1948	4	87	0.20	120	320	0.37

Production histories preceding and subsequent to well tests are presented in Fig. 5.

The analysis of cores from the producing intervals indicated that the sands were sensitive to water. Furthermore, tests of the effect of fresh water on oil permeabilities showed that water damage could be overcome in time by the flow of oil under sufficient pressure gradient. Details of the field and laboratory data are presented in Table 2 and Fig. 5.

Interpretation of Reservoir Data

The sands in each of the fields discussed above are well consolidated and contain clays which seriously affect their ability to conduct fresh water. A large portion of the productive oil sands of field C appear to offer considerable resistance to the flow of the low salinity reservoir water. Yet the productivities of the wells in this field appear to be consistent with the average performance of clean oil sands of similar air permeabilities. The data presented for fields A, B, and D indicate that effective oil permeabilities will be restored at moderate pressure gradients in water damaged oil sands that exhibit water sensitivity.

It is inferred that the restricted flow capacity to water displayed by these sands is due primarily to the fact that the fines and clays present in the porous structures are preferentially water wet. The silts and clays along the pore channels bond water normally associated with their hydrated structures. The amount of water held by clay and the degree of dispersion of the clay particles in water increase as salinity of the water is reduced. The dispersed particles within the water-filled pore channels move with the flow of water to positions which restrict water permeability. This behavior is indicated by permeability changes which occur when the direction of the flow of fresh water in water sensitive sands is reversed. An immediate increase in water permeability is noted with a change in direction of flow. However, with continued flow, the water permeabilites drop very rapidly to about the previous values.

The studies previously described show that oil permeabilities and saturations within the water flooded sands can be restored. It appears that with the application of sufficient pressure differential across the sand body, the oil-water interface can be forced through the larger pore channels. The water-wet particles do not pass through the oil-water interface into the oil and, therefore, are confined within the volume of interstitial water normally associated with the porous structure. The oil remains free of the water wet particles and flows through capillary channels lined with the water which surrounds the entire grain structure.

It was reasoned that if the above mechanism occurred, then a reversal of the flow behavior could be produced by conversion of the bentonites (water-wet clays) within the sands to bentones (oil-wet clays). Laboratory tests were conducted to study this possibility. It was observed that dry oil permeabilities of cores were severely reduced by conversion of the clays to oil-wet types. In addition, the conversion of clays within the sands to oil-wet types produced a marked increase in the capacity of the sands to conduct fresh water. Thus it is concluded that the presence of particles within the porous structure of the sands can seriously interfere with the flow of a liquid which preferentially wets the surfaces of these particles.

The permeability of sands to reservoir water appears to be dependent upon the amount and distribution of reactive solids within the porous structure of the sands and the salinity of the reservoir water. Therefore, permeabilities to the reservoir water may not be indicative of the effective oil permeabilities in the reservoir.

All of the sands previously discussed were well consolidated, and though they exhibited extreme sensitivity to water, their consolidated structure was not destroyed by exposure to fresh water. Observations of flow behavior of thousands of cores during the past 10 years have indicated that water sensitivity of reservoir sands may be brought about by many factors other than the behavior of clays lining pore channels of consolidated sands. These may be classified as follows:

1. Waters of various salinities may disturb cementing material and cause partial disintegration of the sand structure.

2. Clays may be present as lumps or streaks in sands and disturb the sand structure when contacted with water of various salinities.

3. Friable or semiconsolidated oil sands may contain large quantities of silts and fines which are water wet in the reservoir. The content of clays of swelling type may be negligible and differences in permeabilities to brine and fresh water may be small. Thus, the sands may not appear to be water sensitive. However, an increase of water saturation in such sands may sharply reduce the gross productivity of the structure due to movement of particles with the flow of water. The flow of either brine or fresh water will harm such a sand structure.

Where invasion of water will alter the sand structure as in 1, 2, and 3, it cannot be expected that the flow of oil will regain the native productivity of the reservoir sand. In these instances the specific permeability of the sand structure is reduced, and the effective permeabilities to all fluids are reduced accordingly.

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BOOK

A.S.T.M. STANDARDS ON ELECTRICAL INSULATING MATERIALS. Prepared by A.S.T.M. Committee D-9, and published by American Society for Testing Materials, 1916 Race Street, Philadelphia. 590 pp. $5.25.

The 1953 edition of this compilation contains in their latest approved form, 75 widely used standards, including 56 test methods, 16 specifications, 2 recommended practices, and 1 list of definitions with procedures relating to conditioning and weathering.

INSPECTION APPARATUS in place on Southern California Gas Co.'s 26-in. line. Fig. 1.

PROGRESS REPORT:

Ultrasonic Inspection

. . . for internal pipe-line corrosion

Corroded areas inside a pipe line can be located and measured accurately. Procedures for rapid scanning and handling scanning data are still to be developed.

by S. K. Gally*

FIELD tests show that ultrasonic equipment can provide a practical and accurate means for locating and measuring corroded areas inside a pipe line and for discovering defects in the pipe wall. Because of its narrow ultrasonic beam, pits can be detected and their depths measured.

Still to be developed before this equipment can be used for routine inspection of a line are a method for rapidly scanning the pipe surface so that the narrow beam does not miss corroded areas, and a means for assimilating the mass of information produced by such a complete and rapid scan.

Corrosion problem . . . Discharge pipe lines at a Southern California Gas Co. compressor station near Taft had suffered internal corrosion because of moisture condensation in the lines and the presence of traces of oxygen, carbon dioxide, and hydrogen sulfide. Although this corrosion has been arrested by the installation of gas-dehydration plants to depress the dew point of the gas below ground temperature, an inspection of the lines was planned to determine the extent and severity of the internal pitting.

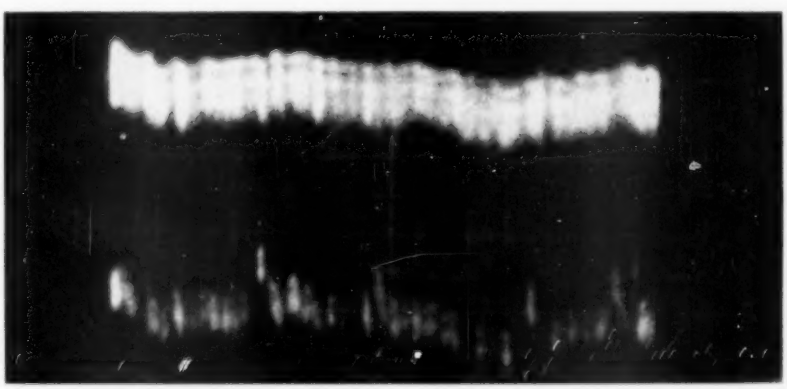
This provided an opportunity for a field trial of the ability of ultrasonic inspection equipment to locate and measure internal pipe-line corrosion, since the pipe could later be removed and the actual wall thickness compared with that measured by the ultrasonic equipment.

Inspections were made at one location on a 12-in. pipe line and at four locations along a 26-in. pipe line. The asphalt coating was removed from the pipe but there was no other preparation of the surface for the inspection.

Fig. 1 shows the apparatus in place on the 26-in. line. On the left is the oscilloscope on which the B-scan image appears with the camera for recording attached. Behind the oscilloscope, and partly obscured by it, is the chassis containing the electronic circuits which generate the ultrasonic impulses and receive the echoes. The carriage, which is held to the pipe by permanent magnet wheels, holds the quartz crystal transducer which can be scanned back and forth the length of the carriage. Also on the scanner carriage is the potentiometer which causes the oscilloscope beam to be deflected horizontally as the transducer is scanned along the pipe.

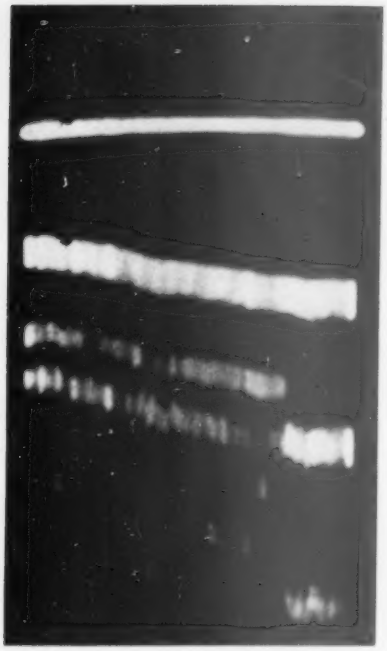
Electric power was supplied by a portable gasoline-engine-driven a.c. generator with voltage-regulating transformers. Water for coupling the ultrasonic energy to the pipe was supplied by gravity feed from a tank on a pickup truck, or from a water hydrant where possible. The local water was untreated except for the addition of a wetting agent to the tank.

Inspection procedure . . . Inspections were made at a minimum of four points on the circumference of the pipe at each location. Since the corrosion was suspected to be greatest near the bottom of the pipe, three out of four inspection points were marked on the bottom third of the pipe. Experience showed that a better procedure was to search for the corroded areas by moving the scanner while watching the oscilloscope. When thin



TYPICAL PHOTOGRAPH from oscilloscope screen during inspection of 26-in. line. Fig. 2.

*Southern California Gas Co. Paper presented at Pacific Coast Gas Association meeting, Santa Barbara, 1953.



PIPE LAMINATION is indicated by echoes in B-scan of a pipe area. Fig. 3.

spots or defects were located they could be marked with paint on the pipe and a permanent record of the oscilloscope trace made with the camera.

The ultrasonic inspection disclosed that the 26-in. pipe was pitted at many points. A typical photograph from the oscilloscope screen is shown in Fig. 2. The upper trace is the echo from the outer surface of the pipe, the lower trace, the echo from the inner surface. The vertical distance between the traces is proportional to the thickness of the pipe wall. The "pips" in the lower trace indicate pits in the pipe. The curvature of the traces is caused by a variation in the distance between the transducer and the pipe as it is moved along the pipe.

The inspection also disclosed that there were laminations or other internal defects in some of the pipe. Fig. 3 shows the B-scan of an area where there was a lamination in the pipe. The additional echoes are caused by reflections of the sound between the lamination and the pipe surfaces.

Pipe examination . . . All the pipe which had been inspected ultrasonically was removed for a complete examination. The inside of the pipe was coated with a thick layer of corrosion products. There were many large rust tubercles and beneath each tubercle was a pit in the steel.

The pits in the 12-in. pipe lay in two rows 1 to 2 in. apart along the bottom of the pipe. The deepest pit was 0.100 in. in depth. The ultrasonic inspection failed to disclose this corrosion because the scan on the bottom of the pipe had been made midway between the two rows of pits. The remainder of the pipe was only slightly corroded except for an occasional isolated pit. The ultrasonic inspection records showed the pipe wall thickness to lie between 0.32 and 0.34 in. The thickness measured with a micrometer varied between 0.322 and 0.338 in., except for the pits.

At the first location on the 26-in. line, there was pitting in the top portion of the pipe, the deepest pit measuring 0.080 in. Again, because ultrasonic inspection had been made at arbitrary points on the circumference of the pipe, the worst pitting was not detected. However, a slight defect was located about midway through the pipe wall. Pieces of pipe which included this defect were cut out and etched in a hot hydrochloric acid solution. The etching disclosed a dark line, in the pipe wall parallel to the surface, which seemed to be an inclusion or segregation in the metal rather than an actual open seam.

At the second 26-in.-line location, the ultrasonic inspection showed pitting at most of the points scanned. Examination of the pipe disclosed pits which corresponded exactly in position with marks made on the outside of the pipe at the time of the ultrasonic inspection. The minimum wall thickness determined from the photographic records of the ultrasonic inspection were within 0.01 to 0.02 in. of the measured minimum wall thicknesses.

The third 26-in. line location was similar. Pits located ultrasonically and marked on the pipe were found where marked. Pit depths scaled from the photographic records agreed within 0.01 to 0.02 in. of the measured values.

The last section of 26-in. pipe examined was not corroded as badly as the other sections but the ultrasonic inspection disclosed at many points a strong reflection from within the pipe wall which was identified as a lamination. Pieces were cut out and etched and an open seam or lamination could be seen in each case.

A brief inspection was also made on the side of a vertical gas scrubber. No corrosion was observed but a lamination in the plate was detected.

Equipment Features

by D. C. Erdman*

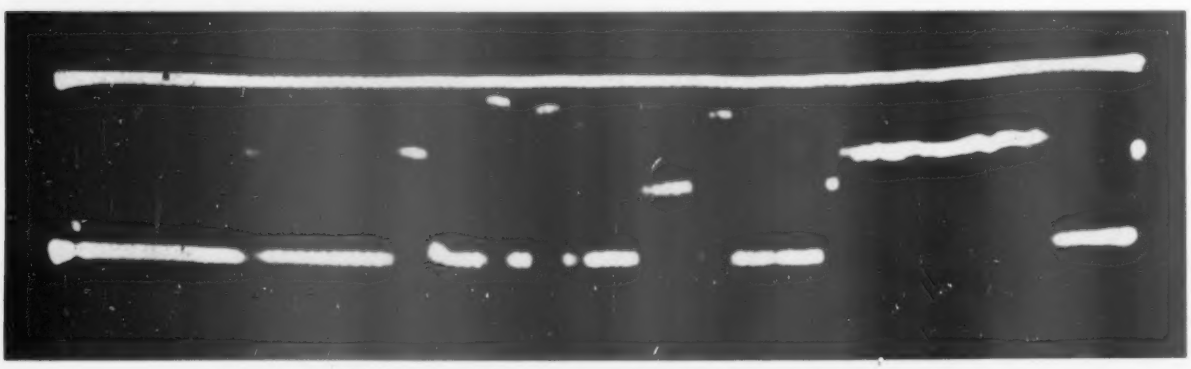
A CONSIDERABLE need exists for an instrument which can show the depth and extent of the corrosion pits that occur on the inner wall of pipes and storage tanks. A number of instruments have been used for this work, but they have certain shortcomings.

Thickness determination, based on ultrasonic principles, has the advantage that ultrasound will reflect from any discontinuity in the metal, and thus will not give false indications when the metal is backed with rust, coke, or liquid.

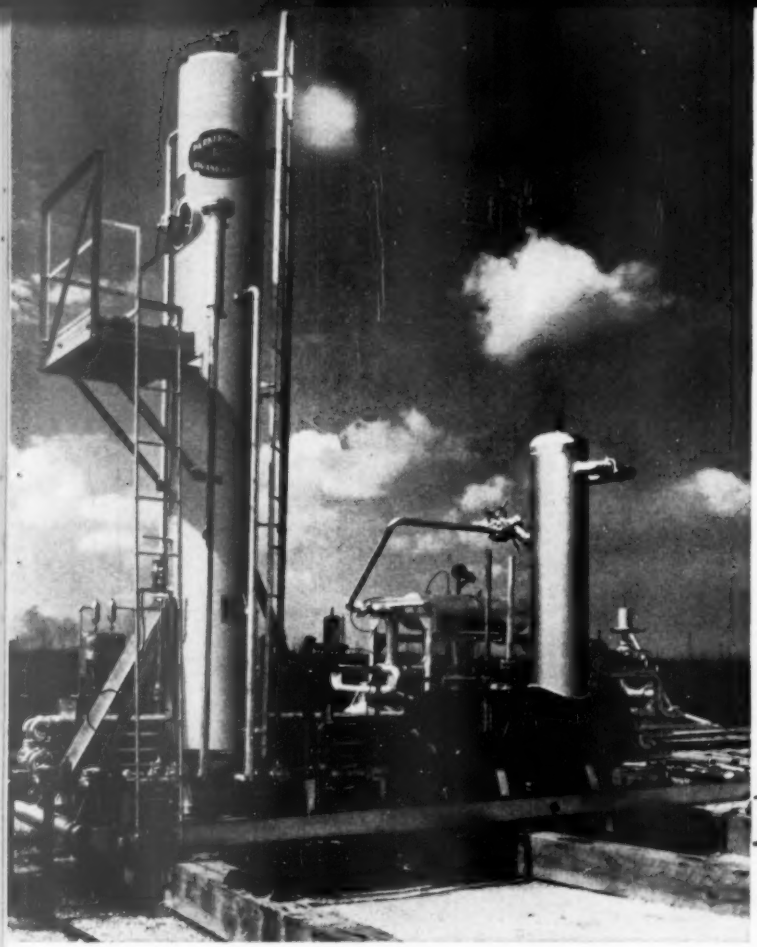
During the past 3 years, some rather great improvements have been made in the echo-type ultrasonic gage, mostly as a result of the increasing need to detect flaws lying close to the surface of aircraft sheet aluminum. Use of higher ultrasonic frequencies and more

(Continued on page 66)

*Electro Circuits, Inc.



LAMINATED ALUMINUM PLATE in correct geometry is obtained ultrasonically. Fig. 4.



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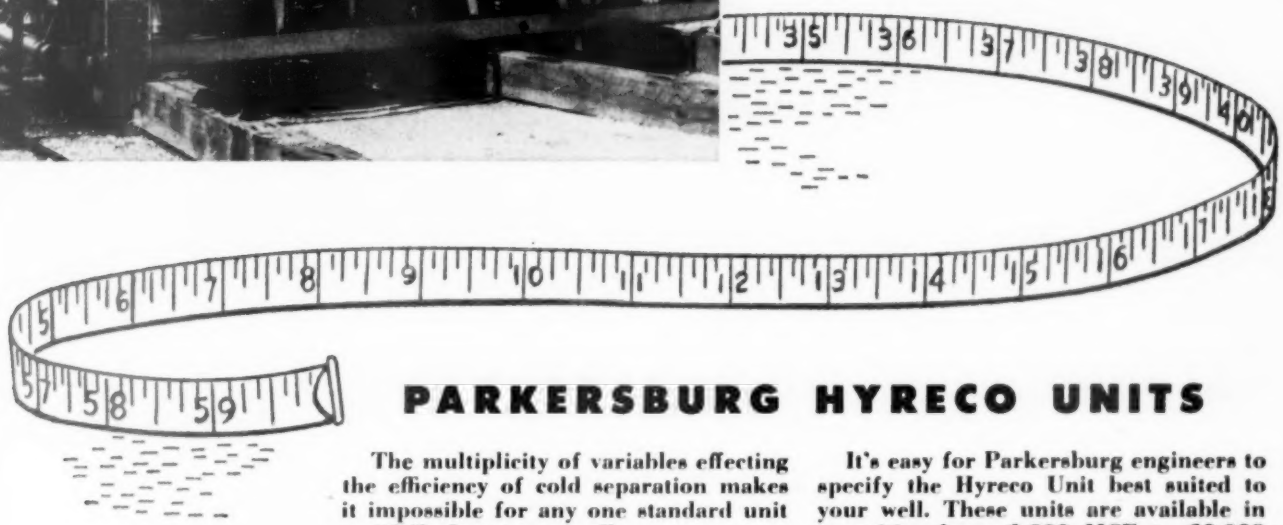

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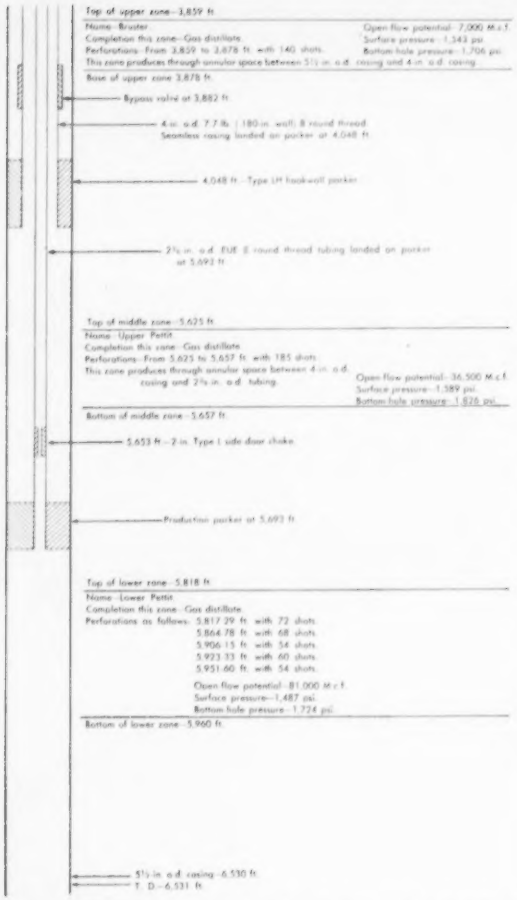
Top of upper zone—3,859 ft.
Name: Bruster
Completion this zone—Gas distillate
Perforations: From 3,859 to 3,878 ft. with 140 shots.
This zone produces through annular space between 5½ in. o.d. casing and 4-in. o.d. casing
Open flow potential—7,000 M.c.f.
Surface pressure—1,343 psi.
Bottom hole pressure—1,706 psi.
Base of upper zone 3,878 ft.
Bypass valve at 3,882 ft.
4-in. o.d. 7.7-lb. (.180-in. wall) 8 round thread seamless casing landed on packer at 4,048 ft.
4,048 ft.—Type LH hook-wall packer
2⅜-in. o.d. EUE 8 round thread tubing landed on packer at 5,693 ft.
Top of middle zone—5,625 ft.
Name: Upper Pettit
Completion this zone—Gas distillate
Perforations: From 5,625 to 5,657 ft. with 185 shots.
This zone produces through annular space between 4-in. o.d. casing and 2⅜-in. o.d. tubing.
Open flow potential—36,500 M.c.f.
Surface pressure—1,589 psi.
Bottom hole pressure—1,826 psi.
Bottom of middle zone—5,657 ft.
5,653 ft.—2-in. Type I side door choke
Production packer at 5,693 ft.
Top of lower zone—5,818 ft.
Name: Lower Pettit
Completion this zone—Gas distillate
Perforations as follows: 5,817-29 ft. with 72 shots
5,864-78 ft. with 68 shots
5,906-15 ft. with 54 shots
5,923-33 ft. with 60 shots
5,951-60 ft. with 54 shots
Open flow potential—81,000 M.c.f.
Surface pressure—1,487 psi.
Bottom hole pressure—1,724 psi.
Bottom of lower zone—5,960 ft.
5½-in. o.d. casing—6,530 ft.
T. D.—6,531 ft.

Fig. 1—Diagrammatic sketch of triple completion installation, Carthage field, Panola County, Texas.

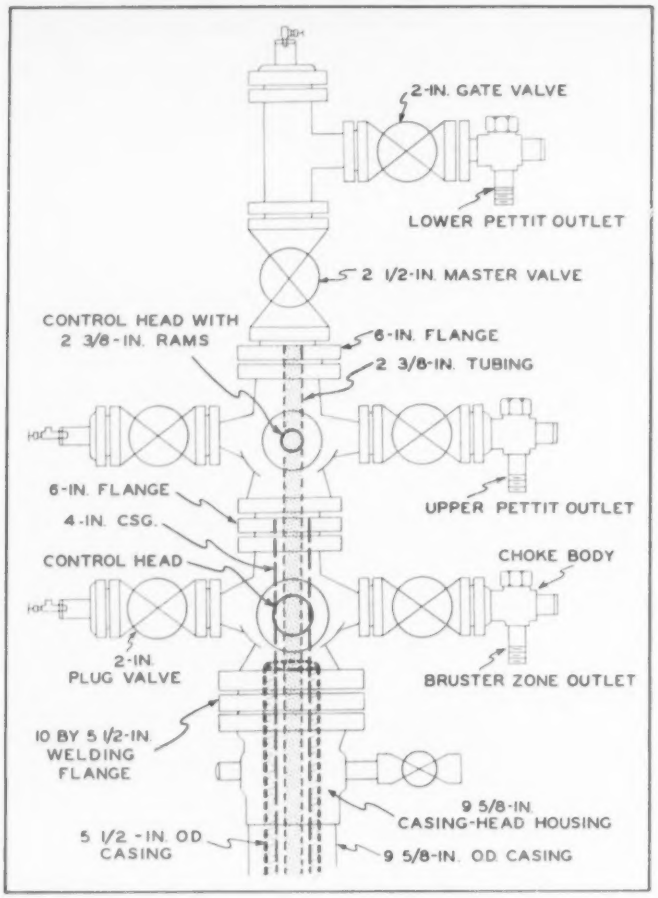

Fig. 2—Well-head controls for triple completion produces from Bruster sand through outer annulus, from upper Pettit through inner annulus and from lower Pettit through tubing.

Carthage Field Gets Triple Completion

Bruster zone added to make third producing horizon

by William Bruster*

A WELL producing from three different zones was completed early this year by E. R. Sink, operator (Alfred C. Glassel et al.) on the Carthage Unit lease, Well No. 11, in Carthage field, Panola County, Texas. The well originally was drilled as a dual completion in September-October 1945, to the upper and lower Pettit limes. Upon recompletion in January 1953 with the Bruster zone in the upper Glen Rose added, this well became the first triple gas-condensate producer in the field.

A triple completion represents a considerable saving when the cost of drilling an additional well is otherwise involved. And, of course, less steel is used on a triple completion (see Fig. 1).

A successful completion is dependent upon a precise installation procedure of subsurface equipment. Also, the use of well-head equipment not encountered in dual or single completions is required to insure control of the well during various steps of triple completion (see Fig. 2).

Pertinent data pertaining to the producing zones are as follows:

Zone designation	Zone name	Perforations	Open flow potential, M.c.f.	Production	Bottom-hole pressure, psi.
Carthage Unit 11-C	Bruster	3,859-3,878	7,000	Gas Condensate	1,706
Carthage Unit 11-C-A	Upper Pettit	5,625-5,657	36,500	Gas Condensate	1,826
Carthage Unit 11-T	Lower Pettit	5,817-5,960	81,000	Gas Condensate	1,724

Dual completion . . . On the original completion in 1945, 9⅝-in. o.d. surface casing was set at 1,450 ft. An 8¾-in. hole was drilled to 6,531 ft. and 5½-in. o.d. 15.5-lb. casing was set at 6,530 ft. Cementing of casing was done in two stages. Temperature survey showed cement top at 2,900 ft. The upper Pettit and lower Pettit zones were perforated and used in the dual completion.

Operational steps for triple completion. The operational steps for making the

*Superintendent for E. R. Sink, operator, Carthage field.

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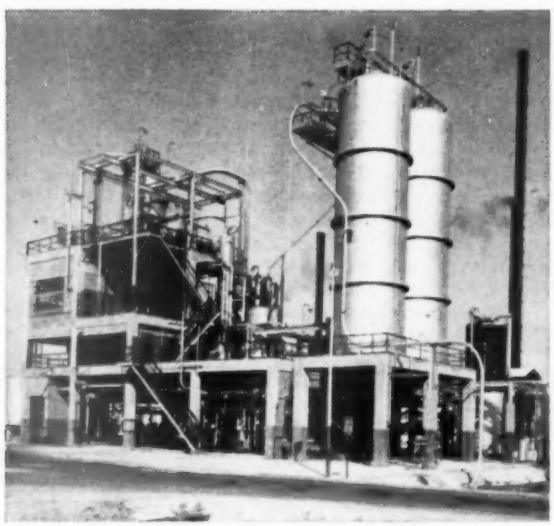

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triple completion were as follows:

1. The packer used in original dual completion was removed from hole.

2. The bridging plug was set at 4,070 ft. with 90-ft. cement plug on top.

3. The Bruster zone was perforated and a drill-stem test was run.

4. The bridging plug was drilled out and production packer on wire line at 5,693 ft. was set above zone 11-T.

5. Casing (4-in. o.d., 8 round thread) was run. It landed at 4,048 ft., using packer at 3,882 ft. This packer separates zones 11-C and 11-C-A. Casing-head control for 4-in. o.d. casing is ram-type head with rams to close on 4-in. o.d. casing. Four-inch o.d. casing was suspended from 6-in. series 900 double studded flange threaded 4 in. o.d. 8 round thread.

6. Mud in annular space between 5½-in. casing and 4-in. o.d. casing was displaced with water by reverse circulation through bypass valve at 3,882 ft. Gas at 1,000 psi. followed the water. Casing was lowered to hanging point, closing bypass valve. The bottom of double-studded 4-in. o.d. hanger flange was bolted to top of 10-in. by 6-in. ram-type control head, confining the upper zone to the annulus between 4-in. o.d and 5½-in. o.d. casing, and the upper zone (11-C Bruster) was allowed to clean itself.

7. The 2⅜-in. o.d. tubing with tubing seal nipples and locator sub was set in 5½ by 2-in. packer at 5,693 ft., with pressure-control side-door choke landing nipple with four ½-in. side ports in string at 5,653 ft. Tubing of 2⅜-in. o.d. was suspended from a 6-in. series 900 flange threaded 2 in. E.U.E. 8 round thread. Casing-head control is 6 by 6-in. head with rams to close on 2⅜-in. o.d. tubing.

8. Mud in hole was replaced by water and the water was followed by high-pressure gas which lowered water column sufficiently for zones 11-C-A (upper Pettit) and 11-T (lower Pettit) to come in.

9. Zones 11-C-A and 11-T were allowed to clean themselves, then the mandrel was run on wire line to side-door choke at 5,693 ft. confining zone 11-T to the 2⅜-in. o.d. tubing and zone 11-C-A to the annulus between 2⅜-in. o.d. tubing and 4-in. o.d. casing.

10. A differential flow test showed that both packers were holding.

11. All three zones were acidized with hydrochloric acid.

12. Both packers were tested with 800-psi. differential, both above and below their locations. This differential was well above any anticipated differential in future producing operations.

Equipment Features

(Continued from page 62)

specialized radar-type circuits have made it possible to obtain echoes from defects as close to the surface as .1 in. This means that the metal walls of a pipe could be measured providing they were greater than .1 in. thick. Thus it has become possible to apply this improved instrument to the task of corrosion detection.

Pitting corrosion . . . Another factor must be considered in testing for pit-type corrosion. This is the need for the probing ultrasound beam to have a very small diameter. The diameter would need to be in the neighborhood of the diameter of the bottom of a corrosion pit. It has been found that a probing beam diameter of ⅛ in. will give satisfactory detail as to the thinness of metal directly over the pit.

If one intends to inspect a pipe or the wall of a storage tank using a probe only ⅛ in. in diameter, he will find that the rate of motion of the probe must be quite high in order to cover a suitable area. An example would be the task of thoroughly inspecting a square foot sample of plate. If no overlap of the path of the probe is allowed, it would take 96 strokes of 12-in. length to cover the square foot section. It is much the same problem as faces a painter. It takes a small brush to show fine detail.

A rather obvious step is to mechanize the motion of probe holder so that controlled, rapid scanning is possible.

Data handling . . . Of considerable concern is the disposition of the thickness data that are collected by such a device. Note that separate thickness readings are available from each of the ⅛ by ⅛-in. inspection areas. Thus in a badly corroded square foot sample, one would have 9,216 answers to record. With suitable scanners, one can theoretically arrive at 1,000 answers per second, i.e., 1,000 thickness determinations per second. Thus a monumental information-handling problem is posed.

One solution is to portray continuously on a television screen the cross-section view of the metal under the probe. Thus one can see at a glance how thick the metal happens to be at any instant. Pits and shallow areas are drawn to some exact preset scale, either one to one, or magnified. The inspector can then watch the TV screen, and photographically record the cross-section views only when scanner has progressed to a corroded area.

Another method is to have an automatic camera record on movie film each pass of the scanner. Thus a given frame of the 35-mm. film would show one 12-in.-long inspection pass. As long as these inspection passes are made in an organized manner, with one frame exposed per pass, the film can be projected in motion, giving the inspector a continuously unpeeled view of the metal. The disadvantage of this approach is that it involves using a camera with the resultant need for darkroom processing.

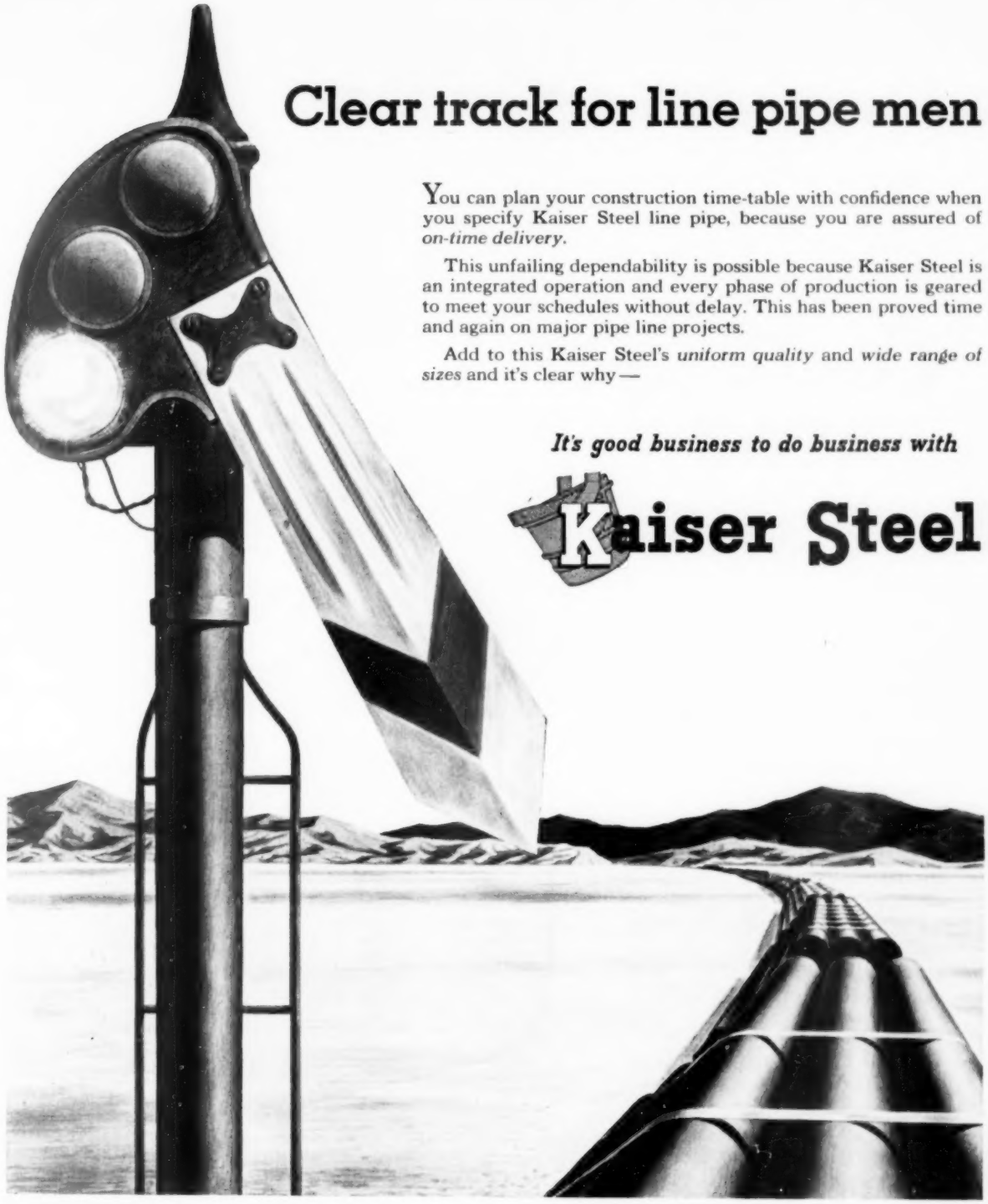
If standards can be set as to the depth of a corrosion pit that can be tolerated, electronic circuits can be applied which will ring an alarm every time a deep pit is encountered. The same alarm could plot areas that were smoothly eroded, or areas containing lamination. It is relatively simple to feed the alarm signal into a circuit that will show the rate of arrival of the thin spots. Thus, this circuit would provide a figure of merit for a plate or pipe. This figure would be a measure of the number of deep pits per foot of scan, or per square foot of plate area. Such information would arrive at a rate that is practical to record with pen recorders.

We are attempting to build a version of this cross-section displaying instrument that draws cross-sections on paper, using two pens: one to draw the outer surface, and the other to draw the inner surface of the metal. It is certain that one would have to scan at a slower speed in order to give the pens time to write the information.

The problem of causing ultrasound to pass from a quartz crystal transducer into the wall of a pipe is rather complex. The best solution we have found to date is to use a small-diameter water stream to couple the ultrasound from the quartz to the metal. Advantages obtained from use of the stream are that there is no abrasion to the quartz due to contact with dirt or rough areas on the surface of the metal, nor does the quartz have to be accurately aligned relative to the metal. Experience to date shows that it takes about a gallon of water per square foot of metal inspected. It is unfortunate that ultrasound will not travel more than .001 in. through air.

Fig. 4 shows a picture obtained ultrasonically of a laminated aluminum plate in nearly the correct geometry. The top line is the top of the part, the intermittent bottom line is the bottom of the part. The breaks in the bottom indication are caused by shadows cast by the defects which are shown in their correct position within the part.

Fig. 1 shows the equipment used in the field experiments. It should be realized that this represents an experimental setup and consists mostly of laboratory equipment. The principles of the process were demonstrated and a good estimate of the possible speed can be given.



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Continuous Weld—Plain End	2⅜" to 4½" O.D.	Up to 40'	Standard	Fontana, Calif.
Electric Resistance and Fusion Weld—Plain End	14" to 18" O.D.	Up to 40'	.250" to .500"	Napa, Calif.—Basalt-Kaiser
Electric Resistance Weld—Plain End	5⅝" to 12¾" O.D.	Up to 55'	.188" to .375"	Fontana, Calif.
Electric Fusion Weld—Expanded—Plain End	20" to 30" O.D.	Up to 40'	.250" to .500"	Napa, Calif.—Basalt-Kaiser

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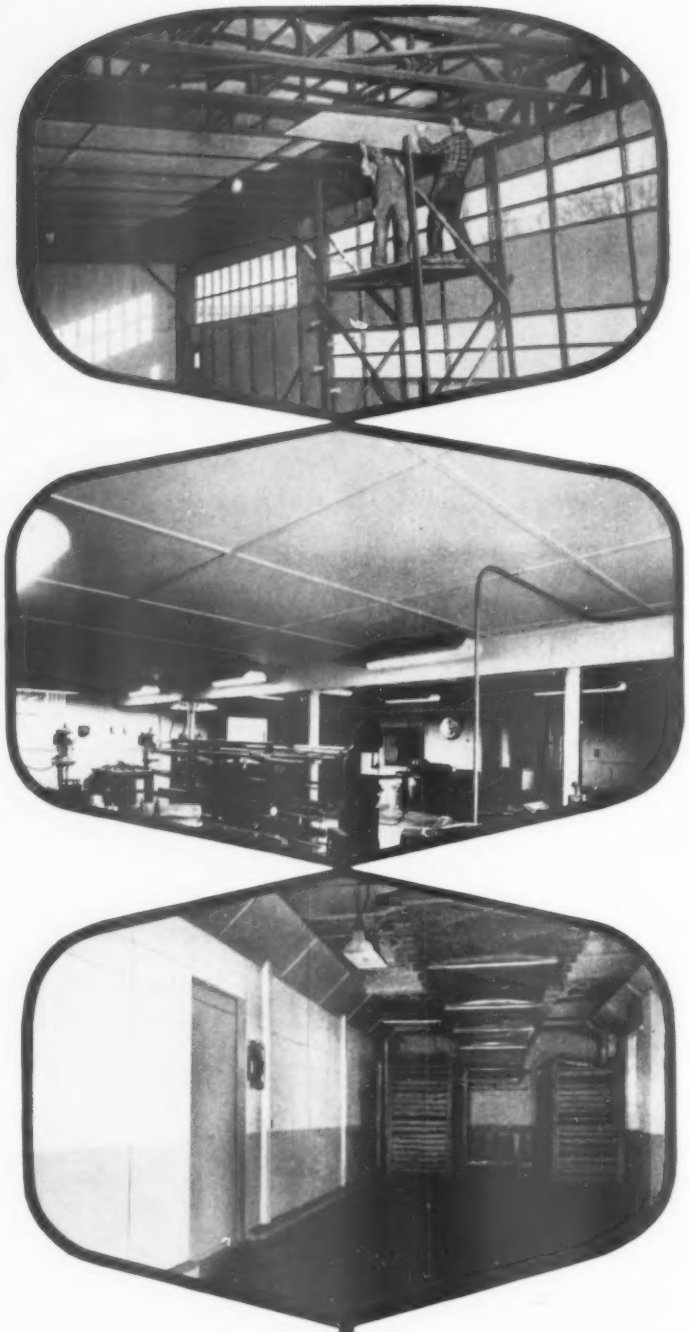

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Manual rates for workmen's compensation insurance for Texas oil and gas lease work have increased 80 per cent in the last 8 years, from $2.76 in 1945, to $4.97 in 1953. The compensated cost of 1,853 recent accidents reported to the Texas Employers' Insurance Association by a group of Texas contractors was $429,065.59. Those injured were employes of concerns specializing in contract service for lease owners.

This accident analysis was prepared by the safety engineering department of T.E.I.A. for the benefit of oil and gas well contractors engaged in lease work.

by H. E. Scates*

DO you know what a mugwump is? In addition to its original political connotation, a mugwump has later been described as a person who sits on the fence of a given issue with his mug on one side and his wump on the other, uttering discouraging sounds, and doing good neither for himself nor anyone else. This, perhaps, fits a gentleman connected with lease-work operations who gave this analysis the once-over before publication.

He was "for" anything that might help prevent accidents but he didn't believe the average contractor would be interested in a printed analysis on the subject. Despite the various types and causes of accidents as illustrated by Chart 1, he firmly placed the principal cause of accidents on the shoulders of the "new man" and his lack of knowledge concerning possible hazards.

"But if that is true," we asked, "couldn't supervision acquaint new workers with the proper and safe way to perform their jobs?"

"Not in a systematic way like you mean," he answered. "There usually isn't time. A man just picks it up (knowledge of hazards) as he goes along."

Apparently, here is the essence of this man's thinking concerning safety in lease-work operations: (1) Reflecting his own disinterest, he does not believe that other contractors would be interested in a factual analysis of the accidents occurring in their industry. (2) In a manner that is vague and general, he holds that the new worker's unfamiliarity with the job is a principal accident cause. (3) He does not seem to realize that failure to supply proper

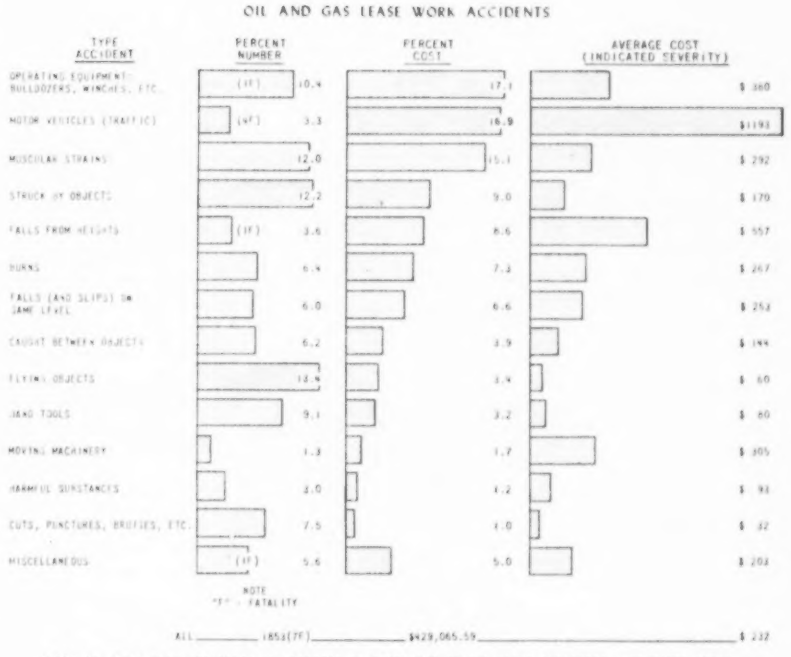


Chart 1—Drilling and producing personnel should study these data involving "lease work."

*Rsearch engineer, Texas Employers' Insurance Association.

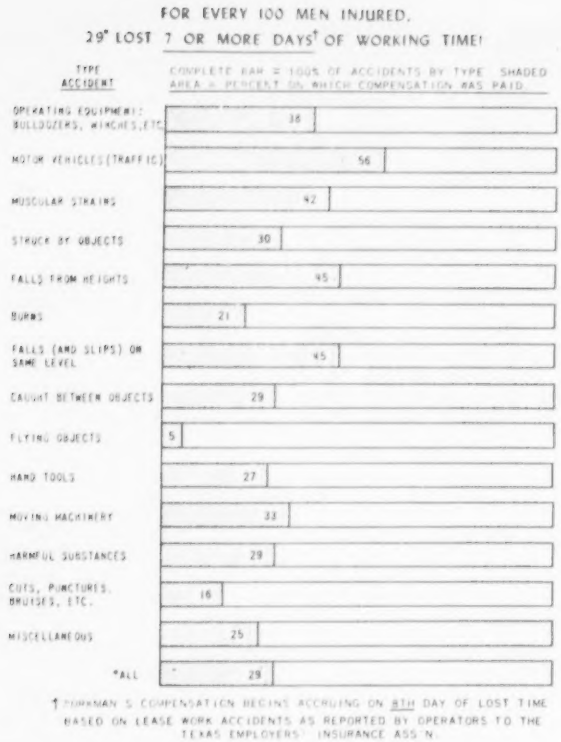


Chart 2—Another type of data form, highly significant.

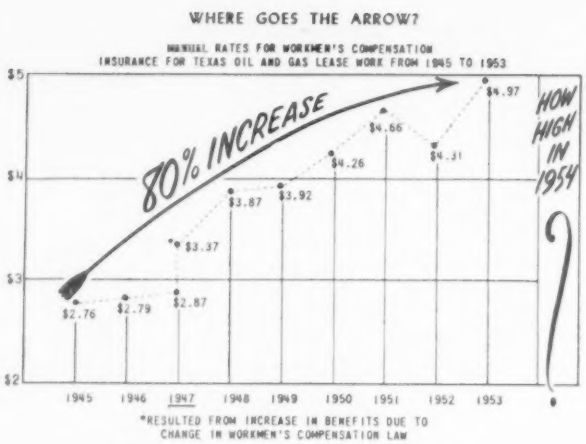


Chart 3—The record, from 1945 to date.

and consistent safety supervision is in itself **a major cause of accidents!**

Let us add in haste that we do not accept one man's opinions on safety problems as representing those of the great majority of lease-work contractors. We know better because another man sat down, studied Chart 1, and made suggestions now incorporated in it. He suggested Chart 2. He was interested. He was of the school that **took** time to prevent accidents! Still, each man mentioned is logically an example of another. Where do you stand? When an accident occurs do you feel that calling someone on the carpet will correct the cause of the accident? Many employers and supervisors have this attitude, an attitude that forbids their accepting the kind of responsibility expressed so well in the following:

Responsibility Is Not Blame

The idea that "the supervisor is responsible for the safety record of his department" is one of the generally accepted fundamentals of accident-prevention work.

You may be "responsible," however, without being "to blame." Safety is similar to other responsibilities of a supervisor. He gets things done the right way by getting them done the safe way.

After an accident has occurred, the knowledge and experience gained from investigation are invaluable. Investigation of an accident should not be made with the idea of placing blame. Usually it does no good anyhow. An accident that has occurred is history. Nothing can undo that accident. It's not "who" was at fault, but "what" was at fault.

Blaming someone for an accident will not prevent another, but accepting and discharging the responsibility for **correction** of the cause will . . . and does . . . prevent accidents.

—The Steering Wheel.

Operating Equipment

There were only 193 of these accidents but their compensated cost was more than $73,000. Many of the accidents involved equipment of a miscellaneous nature but the most spectacular—and damaging—mishaps were 66 accidents concerning the operation of bulldozers, maintainers, tractors and ditching machines, also cars and trucks. (Car and truck traffic accidents are excluded. See Chart 1.)

Of the 66 accidents so defined, about half were caused by an operator's unsafe act. Most of the remaining accidents in this group occurred when a second individual exposed himself to the movements of these machines and vehicles.

In one case, the only fatality for this group, a crew of three men were hauling a dozer on a trailer when the truck became mired in mud. To lessen the weight on the truck's rear wheels it was decided to move the dozer from the front to the rear of the trailer. Side clearance was close and it was necessary for the operator to perform a slight steering maneuver. It isn't clear why, but the man engaged one steering pedal to such a degree that the dozer pitched off the trailer and upset on the man. One coworker was alongside the trailer. The other remained in the truck cab.

A second dozer operator worked progressively closer to a creek bank while he was backfilling a ditch. The bank caved in, the dozer upset and the operator wound up with a broken leg and a crushed pelvis. Presumably, he had intended all along to remain a safe distance from the bank.

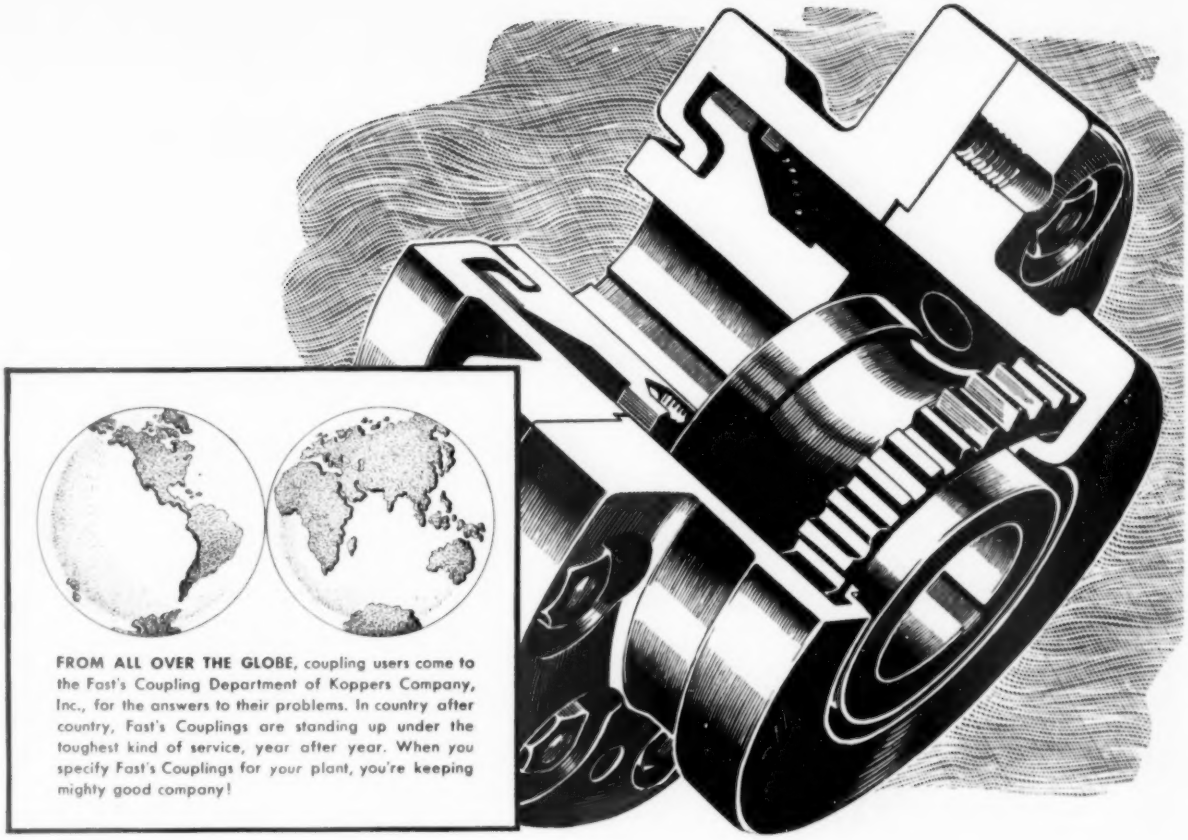
And so it went. The unwary were caught between backing trucks and secondary objects. Grader blades hit stumps and broke buried pipes. One man was knocked sky-winding by a dragline bucket. The brakes failed on a maintainer going down hill and during the rough ride the operator was tossed off and hurt. This was one of only three accidents directly caused by equipment failure.

In the "you-asked-for-it-department" a man stood on the moving truck of a machine; don't ask us why. For this bit of foolishness he went to the hospital with a mangled leg after getting caught between the track and apron. A second worker walked alongside a moving dozer on which he was tying an oil can. The track ran over his foot.

Elsewhere in this category 29 men were injured when they were caught between suddenly tightening cables and other objects. Two of these sustained amputations when their fingers were caught in cable drums. Five men were struck by breaking cables.

Motor Vehicles

Although it is not the rule, there is usually a small percentage of accidents in any given analysis in which one accident brings injury to more than one



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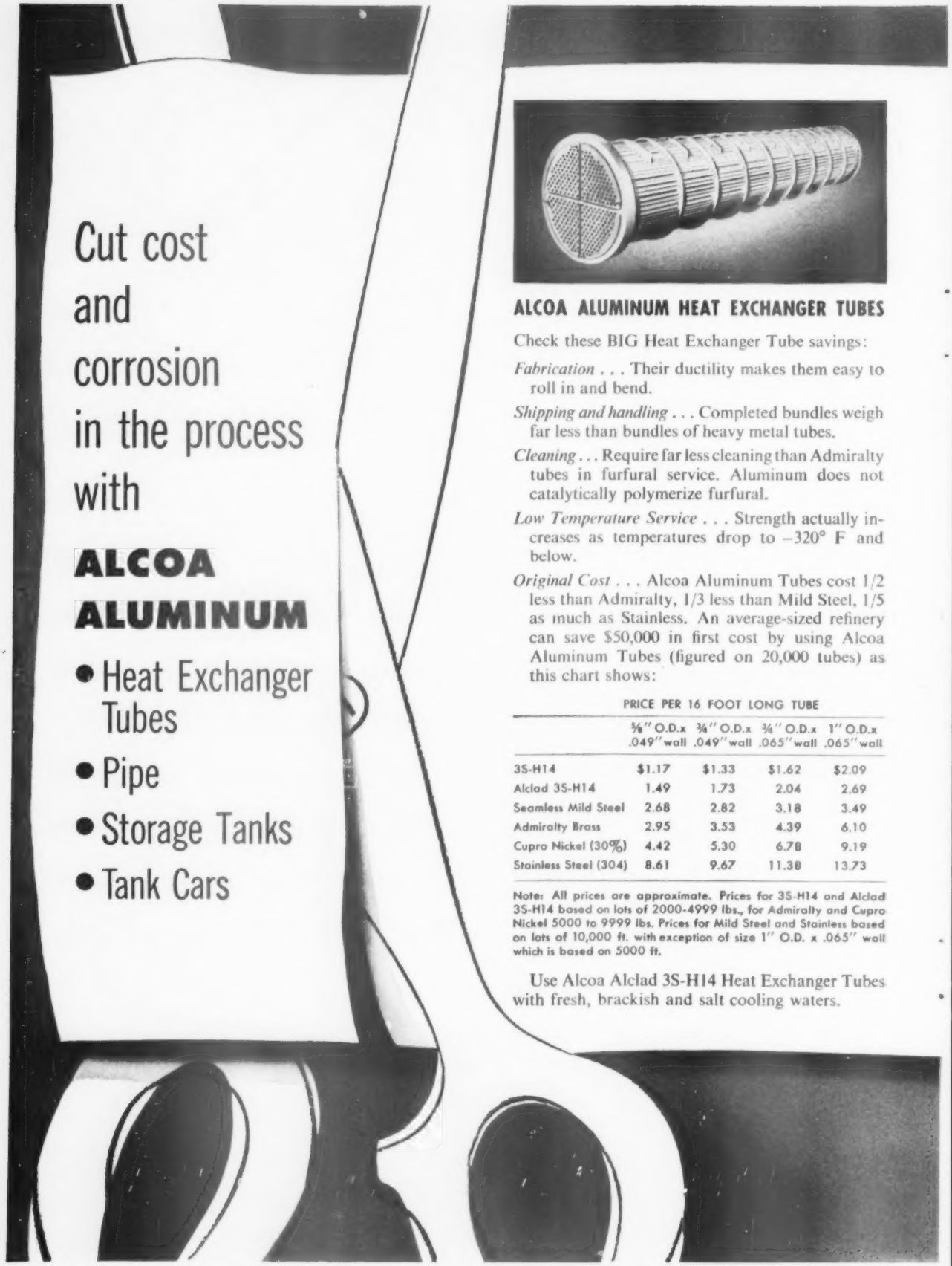

ALCOA ALUMINUM HEAT EXCHANGER TUBES

Check these BIG Heat Exchanger Tube savings:

Fabrication . . . Their ductility makes them easy to roll in and bend.

Shipping and handling . . . Completed bundles weigh far less than bundles of heavy metal tubes.

Cleaning . . . Require far less cleaning than Admiralty tubes in furfural service. Aluminum does not catalytically polymerize furfural.

Low Temperature Service . . . Strength actually increases as temperatures drop to –320° F and below.

Original Cost . . . Alcoa Aluminum Tubes cost 1/2 less than Admiralty, 1/3 less than Mild Steel, 1/5 as much as Stainless. An average-sized refinery can save $50,000 in first cost by using Alcoa Aluminum Tubes (figured on 20,000 tubes) as this chart shows:

PRICE PER 16 FOOT LONG TUBE

	⅝" O.D.x .049" wall	¾" O.D.x .049" wall	¾" O.D.x .065" wall	1" O.D.x .065" wall
3S-H14	$1.17	$1.33	$1.62	$2.09
Alclad 3S-H14	1.49	1.73	2.04	2.69
Seamless Mild Steel	2.68	2.82	3.18	3.49
Admiralty Brass	2.95	3.53	4.39	6.10
Cupro Nickel (30%)	4.42	5.30	6.78	9.19
Stainless Steel (304)	8.61	9.67	11.38	13.73

Note: All prices are approximate. Prices for 3S-H14 and Alclad 3S-H14 based on lots of 2000-4999 lbs., for Admiralty and Cupro Nickel 5000 to 9999 lbs. Prices for Mild Steel and Stainless based on lots of 10,000 ft. with exception of size 1" O.D. x .065" wall which is based on 5000 ft.

Use Alcoa Alclad 3S-H14 Heat Exchanger Tubes with fresh, brackish and salt cooling waters.

Check These Heat Exchanger Tube Uses:

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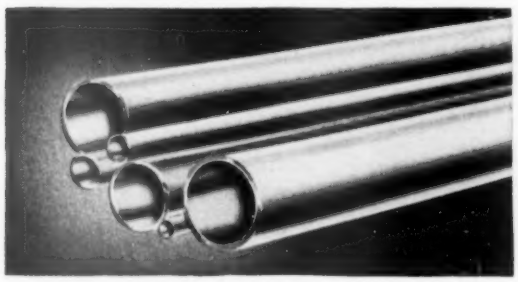
- Amine solution coolers
- Condensers handling hydrocarbon fractions from such processes as Thermal and Catalytic cracking, reforming, polymerizing, etc.
- Furfural condensers and heat exchangers
- Glycol-amine heat exchangers and reboilers
- Hydrogen sulfide gas coolers
- Jacket water coolers
- Lean oil—rich oil exchangers
- Lube oil coolers
- Natural gas compressor aftercoolers
- Propane chilling
- Recompressor aftercoolers
- Vapor recovery condensers
- Wax sweaters

CHEMICAL

- Acetaldehyde
- Acetanilide
- Acetic acid
- Ammonia
- Benzene
- Butanol
- Butyric acid
- Dichlorobenzene
- Ethanol
- Ethylene Glycol
- Formaldehyde
- Furfural
- Gelatin
- Glycerin
- Hydroabietyl alcohol
- Hydrogen Cyanide
- Hydrogen Peroxide
- Isopropanol
- Methanol
- Naphtha
- Nitric acid (concentrated)
- Phenol
- Propylene Glycol
- Pyridine
- Ricinoleic acid
- Stearic, Palmitic, Maleic Oleic acids
- Turpentine
- Xylene
- and many others

Alcoa pioneered aluminum heat exchanger tubes 44 years ago. Write for details and the booklet: *Alcoa Aluminum Heat Exchanger Tubes.*



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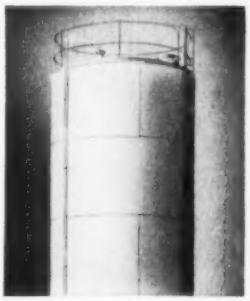

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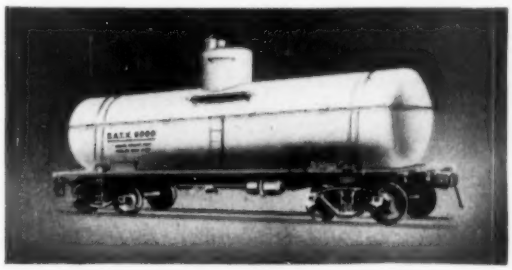
For over 20 years Alcoa Aluminum has been in continuous service handling fatty acids in storage tanks. Aluminum protects the stability and color of essential oils, edible oils, fats, glycerine . . . resists the corrosive effects of sulphur . . . does not stain or discolor products handled . . . is nontoxic . . . inert to many chemicals . . . nonsparking. Write for the pamphlet: *Alcoa Aluminum in the Process Industries.*



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person. This is particularly true of motor-vehicle accidents and in such an event it is necessary to count each individual as an "accident." There were 39 actual accidents in which 61 workers were injured including 4 who were killed. Their low frequency is deceiving and completely out of proportion to their cost of $72,766.31 or 16.9 per cent of this analysis' over-all accident cost.

Eleven accidents occurred during the hours of waning light or darkness. Seven of these were collisions with other vehicles, four head on. Running off the road and overturning was reported in four instances with only one of these involving a curve.

Of the 28 accidents occurring during daylight hours, three were due to equipment failures, these being a blowout, locking brakes, and a loose drag link. There were five collisions with other vehicles and three of these were head on, one occurring on a one-way bridge. Three drivers failed to make curves and overturned. Six ran off the road. Eight overturned on the road itself. Responsibility was placed on fog, wet pavement, loose sand, and dirt. Some reports mentioned no cause at all. One man went to sleep while nothing explains why two others ran into telephone poles.

These details were given so that you would see just how these accidents were reported. Was excessive speed for existing conditions ever admitted, even intimated? No, not once! Human nature doesn't work that way but figure it for yourself. Why blame a curve in the road, a telephone pole or even foggy conditions? These represent no dire hazards to the driver who has his vehicle under control.

Lease-work contractors paid a dear price, not only in damage to or loss of their vehicles (three trucks burned), but also in damage to equipment or materials being transported.

Handling Objects

You won't find this accident type listed on Chart 1 but it's there just the same. It is designated by those workers who suffered muscular injuries, those who were struck by or caught between objects, and those sustaining cuts, punctures, and other skin injuries. Except for a small number, these accident concerned men who were doing manual labor, just run-of-the-mill work. Their injuries resulted from the way they handled themselves or the objects they were lifting, stacking, carrying, or otherwise moving.

There were 222 cases of muscular strains, a type of injury which is rarely spectacular since visual evidence is negligible. Their compensable cost was almost $65,000. Nor did the accidents themselves have the blood-and-thunder atmosphere so often surrounding other mishaps. A man stoops over, seizes a 40 or 45-lb. object and heaves away. Perhaps he suddenly freezes, lets out a grunt or just goes about his business for awhile. But what happened? A muscle in his back or groin had endured too much. Ninety per cent of these muscular strains were due to unsafe lifting practices.

Two hundred and twenty-six men were struck by pipe, boards, various units of equipment, and a host of miscellaneous objects which toppled, slid, swung, and rolled against them. A large number sustained foot injuries at an average cost of $167.41. That kind of money would buy several pairs of good safety shoes but so would the wages the injured men lost.

Most of the 116 workers who were caught between objects sustained hand injuries. The same was true of 139 workers who received cuts, punctures, and so on. This latter group had no monopoly on such hurts but they were brought together because they were not involved in an accident in the strict sense of the word. They were simply handling pointed or sharp objects.

These, then, are the so-called "handling" accidents. Their occurrence was not traceable to the use of tools nor the failure of some equipment to operate properly. The activities of the injured were, of course, varied but 25 per cent of the accidents occurred during loading or unloading operations. One claimant summed things up rather well when he said: "We were taking pipe off of a truck and pipe just fell on my foot." Yep, it certainly did. This man had a lot of time to figure out what went wrong while four bones in his foot healed.

Falls From Heights

Of 66 accidents in this category, 38 involved falls from trucks, dozers, and tractors. In only 10 cases was the vehicle in motion. Two men were riding in a dog house on the back of a truck. The dog house was thrown off. Pipe being hauled struck a tree, whipped around and knocked two men off a truck. Some men were injured when they deliberately jumped from vehicles while others were forced to jump to avoid being struck by objects being loaded or unloaded.

Miscellaneous falls were from ladders, pipe racks, platforms, tanks, and runways. One worker fell from a pumping unit and was killed.

Burns

The use of welding and cutting torches produced 62 per cent of the burn injuries. Sparks and hot metal particles accounted for a small percentage of the burns, mostly of the eyes. Flash burns accounted for 57 additional eye injuries and it is significant that only eight welders were so affected while welders' helpers were the victims in 43 cases. Six workers, otherwise engaged, sustained the remaining eye burns.

This question naturally arises: Were men working as helpers without protective eye equipment? Apparently this was the case. How else can one explain why so many helpers suffered eye injuries when the majority of the men they were assisting did not? It is a certainty that one man took his chances for the report read: "States (he) worked 8 hours with welding t o r c h without benefit of protective goggles." We ask you. **How** could this happen?

One of the most spectacular accidents in this entire study resulted from a rather loose regard for the dangers of gasoline. A crude stove, fed with the fuel, had been set up in the rear of a truck transporting men. The stove upset and the gasoline exploded. Nine men were seriously burned and a tenth suffered back injuries when he jumped from the truck which caught fire. The compensable cost of this accident exceeded $21,000 not counting the truck damage.

Gasoline figured in other accidents also. In six cases it exploded while being used for cleaning purposes. One man had gasoline on his clothing when he backed up to a bucket in which gasoline was burning. He wanted to get warm. He did! He became a torch. These were the same particulars in a second accident except that this victim had spilled diesel oil on his trousers. Five reports explained that gasoline exploded while being put into the tanks of equipment by splashing either on hot engines or exhaust pipes.

Would you weld on a tank that had contained gasoline without **knowing** all necessary precautions had been taken to remove vapors and keep them removed? The man who did it in this study is just plain lucky to be alive. Ditto for a fellow who struck a match while he was standing next to a leaking gas hose. In different accidents two men were ditching for vent lines near a broken pipe. Each decided he needed a smoke. Pouf! What's that about little boys not playing with matches? It would seem some of their elders could profit by knowing when to even use matches.

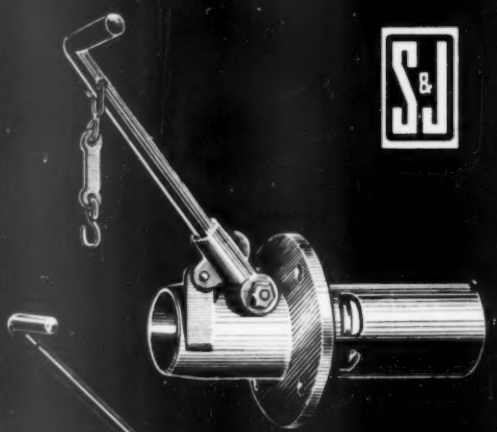
All Other Accidents

One hundred and twelve men who slipped or fell on the same level did

REAL INTERNAL SAFETY!

That's what Shand & Jurs Internal Safety Valves provide for petroleum tanks. T ere's one designed to give any type of tank maximum safeguard against fire exposure and to aid in accident prevention wherever flammable liquids are stored. Each S&J Internal Safety Valve can be held open by a cable and fusible link which melts at 165°, allowing the valve to close tightly and quickly in case of fire.

Fig. ST-885R – This S&J Internal Safety Valve is designed for bulk station distributing tanks. It screws directly into tank and is constructed of all bronze except steel operating shaft. Provides automatic relief of pressure in lines back into tank. Internal spring closes valve. Designed for greater flow and easy maintenance.



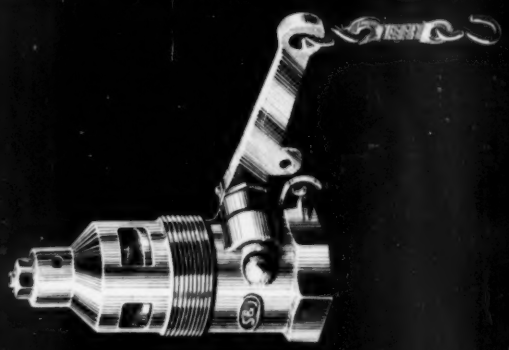


Fig. ST-1640 is designed for gasoline bulk storage. Made of cast steel, has extra heavy spring to withstand back pressure of plant pumping system up to 45 lbs. Pressure above 45 lbs. automatically relieves back into tank,

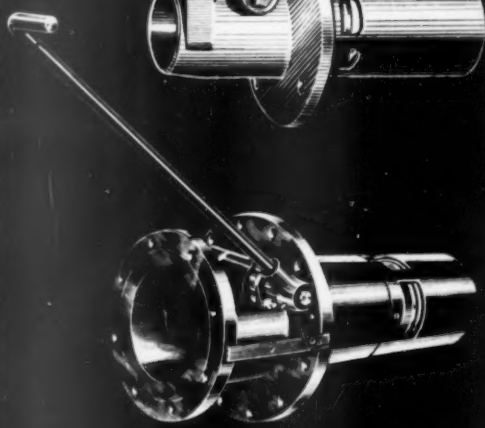


Fig. ST-6810 is designed for full flow, ease of operation and maintenance, yet ruggedly constructed. Opened manually, operating arm permits pulling valve closed if necessary. Larger size valves provided with pilot valve in main disc to facilitate opening.

Fig. ST-709 and ST-605 are designed for tank outlet or inlet lines. Counterweighted disc is held open by cable and fusible link. Valve closes tightly with aid of head pressure. Large sizes also have pilot valve to facilitate opening. Both valves may be closed manually if necessary.

ST-709 utilizes a shaft through a stuffing box and counterweighted arms while ST-605 employs a weighted cable passing through a gas tight oil seal sheave housing on the tank roof. Illustrated and described on separate data sheets.

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so partly for reasons of poor housekeeping. Greasy, wet, or muddy floors and steps were reported as hazards. So were miscellaneous materials scattered about where men were expected to work. Of course we had the fellow who just tripped and fell. Nobody knows why.

Of 248 accidents caused by flying objects, exactly 200 resulted in eye injuries. This is understandable for 132 of these accidents involved hammering, chipping, grinding, and similar operations which produced flying metal particles. Hammering was by far the most frequent circumstance. The remaining flying objects were of a less dangerous nature. They consisted of rust, pebbles, sand, and other miscellany which resulted from conditions following no particular pattern.

In that category concerning tools, the nature of the tool will suggest the nature of the accident. There were 169 tool accidents. Nine involved such power tools as electric drills, power saws, and jack hammers. Otherwise, the leading tools were wrenches, hammers and sledges, crowbars, axes, and hand saws in that order of frequency. There was a scattering of picks, files, spades, and the like.

The 24 machinery accidents ranked last in frequency but fourth in average cost or indicated severity. Belts and pulleys caught nine men and flywheels four. Two each were caught in machine saws and concrete mixers while seven were injured by as many different mechanical units.

There were 55 skin injuries resulting from contact with gasoline, cement, oil, poison ivy, and miscellaneous substances.

Among the remaining accidents in this analysis were cases of heat exhaustion, falling objects, electric shocks, spider bites, and cave-ins. One man, suffering from cirrhosis of the liver, died when this organ ruptured. His condition could have been aggravated by his employment. Like two nonfatal heart-attack cases reported, such organic ailments could probably be detected with preemployment physical examinations.

Conclusion

We have reserved discussion until now of Charts 2 and 3. Remembering the motor-vehicle accidents, the muscular injuries, the burns and the many other serious hurts, cannot you appreciate how 29 of every 100 men in this study lost 7 or more days of working time? Five hundred and thirty-seven men were so concerned. Some lost weeks and months of work. Let us make the reasonable assumption that these men averaged 10 days of lost time. That's 5,370 days or 42,960 manhours if we're thinking about an 8-hour day. What was lost in damaged equipment? Fouled work schedules? Wasted time of coworkers to aid the injured? And when wages were lost, what disruptions entered many homes?

Chart 3, then, shouldn't shock you too much for it only reflects how costly lease-work accidents have been. And you should bear in mind that you, the contractor, shoulder the real accident cost for today's excessively high accident losses are the basis on which tomorrow's workmen's compensation rates will be based.

BOOK

A.S.T.M. STANDARDS ON COPPER AND COPPER ALLOYS. Sponsored by A.S.T.M. Committee B-5 and published by American Society for Testing Materials, 1916 Race Street, Philadelphia. 556 pp. $5.65.

This book brings together in convenient up-to-date form all of the A.S.T.M. Standards pertaining to copper and copper alloys and includes in their latest form 115 widely used A.S.T.M. standards, including 102 specifications; 9 test methods; 2 recommended practices—one for tension test specimens for copper-base alloys for sand castings, the other for designating significant places in specified limiting values; and 2 classifications—one for cast copper-base alloys, the other of copper. A high percentage of the material included in the earlier edition has been revised and four of the methods are new.

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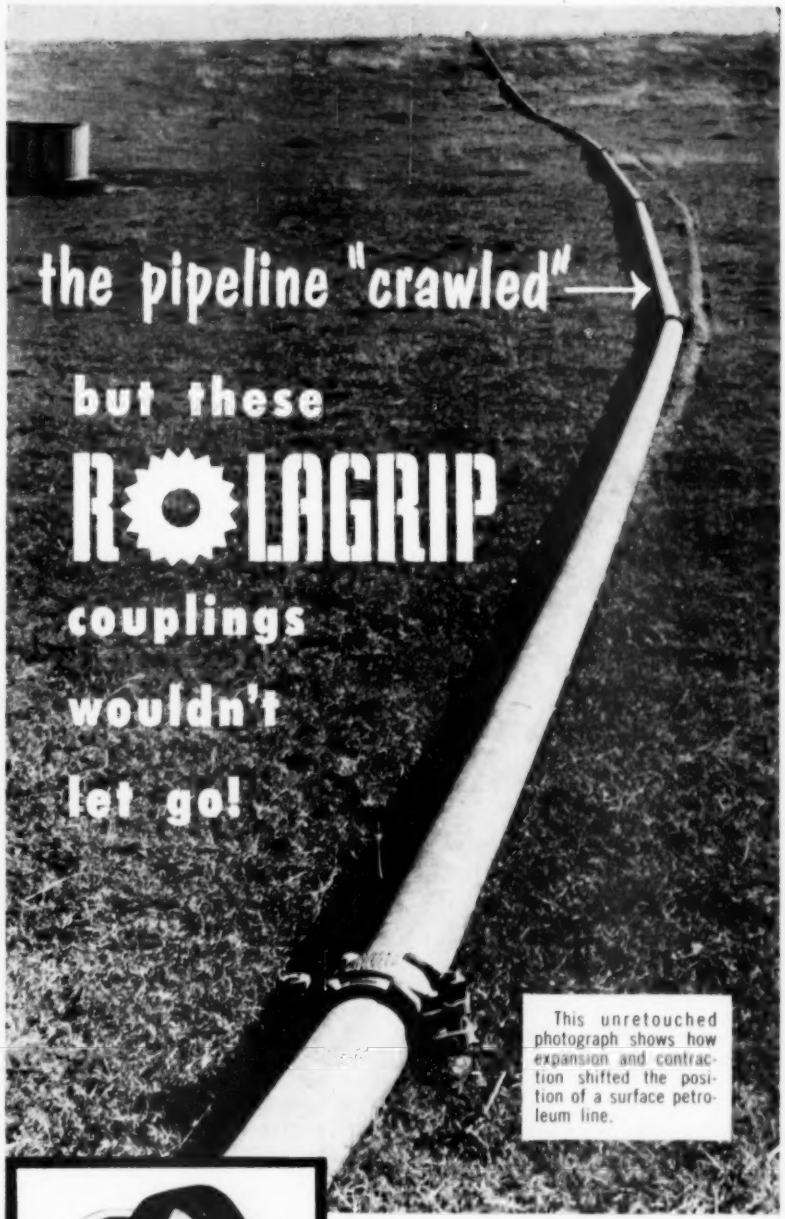
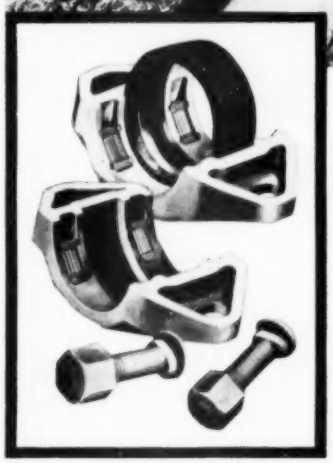


This unretouched photograph shows how expansion and contraction shifted the position of a surface petroleum line.



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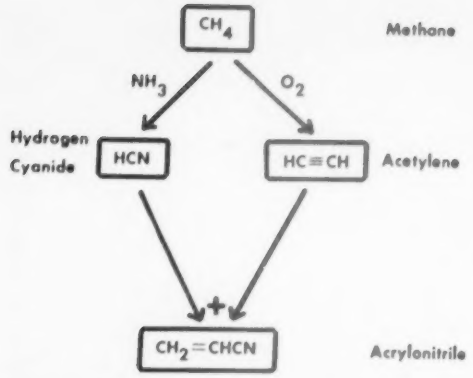
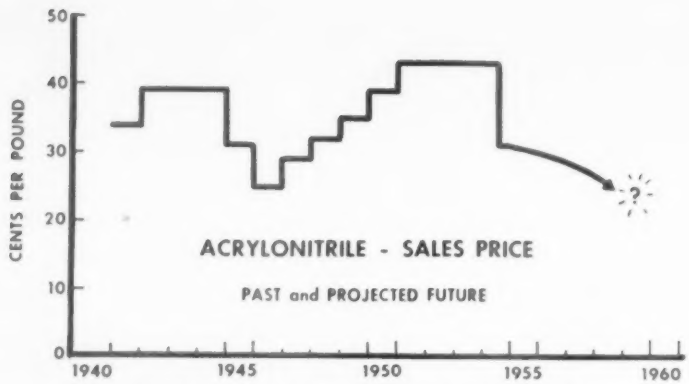


NATURAL-GAS ROUTE for preparation of acrylonitrile. Fig. 1.



SALES PRICE for acrylonitrile, past and projected future. Fig. 2.

PETROCHEM REPORT

New Process for Acrylonitrile

. . . will bring substantial cost reduction

by A. J. Weith*

ACRYLONITRILE will be available to the chemical industry in greater quantity at a substantially lower price early next year when the Fortier plant of American Cyanamid Co. begins its operations at Avondale, La.

This versatile building block, now used extensively in production of nitrile rubber, synthetic textiles, and plastics, will then sell for 31 cents per pound instead of the current market price of 43 cents. This cost reduction promises to encourage the use of acrylonitrile as a chemical intermediate for the production of a large number of useful compounds.

New process . . . A new process which utilizes natural gas in the production of acetylene and ammonia is to be used at the Fortier plant. The ammonia is then reacted with additional methane to yield hydrogen cyanide. The hydrogen cyanide and acetylene are then reacted to form acrylonitrile. A simplified diagram of the process is shown in Fig. 1:

1. Methane, which is separated from natural gas, is partially oxidized to acetylene.

2. Off gases from this acetylene operation are processed to form ammonia which in turn is reacted with methane to yield HCN.

3. Finally, HCN and acetylene are reacted to yield acrylonitrile.

In 1950, Cyanamid research culminated in the design and operation of a pilot plant on the acetylene-HCN step of this series of reactions. At that time, a pilot plant for the production of so-called "synthetic HCN" had been in operation for some time. Information from Germany on the first step, the partial oxidation acetylene step, completed the information required for the commercialization of this new process.

New Acrylonitrile Plants

In 1952, American Cyanamid started construction of a new plant for the commercial production of acrylonitrile by this natural-gas route. This plant, to be known as the Fortier plant, is located 18 miles northwest of New Orleans on the Mississippi and is expected to be in operation by early 1954. It will produce acetylene, HCN, ammonia, and derivatives of these, including acrylonitrile and ammonium sulfate. The first completed unit of the new plant is now producing sulfuric acid. Next to be completed will be the 100-ton-a-day ammonium sulfate facilities.

Other Acrylonitrile Producers

Other chemical companies that have initiated production of acrylonitrile are Union Carbide and Monsanto Chemical companies. The Carbide unit is reported to be producing acrylonitrile from ethylene oxide and synthetic HCN, while the Monsanto plant is based on natural gas. Just last month, B. F. Goodrich Co. announced plans for the erection of an acrylonitrile plant at Calvert City, Ky. This plant will utilize synthetic HCN and acetylene generated from calcium carbide. It should be noted that during World War II, Rohm & Haas Co. also produced acrylonitrile for several years.

Other potential routes for the production of acrylonitrile include the dehydration of lactonitrile, the catalytic oxidation of allyl amine, the catalytic reaction of formaldehyde with acetonitrile, the dehydration of acrolein oxime, the reaction of HCN and various hydrocarbons, and finally, the reaction of certain olefins, ammonia and oxygen.

New uses . . . The use of nitrile-type rubbers and in turn, acrylonitrile, decreased in the immediate postwar period as consumers of these rubbers were forced to develop new uses. Certain of these new uses are of interest —for example:

1. The addition of nitrile rubber to phenolic resins—It was found that nitrile rubber is compatible with the well-known phenolic resins. These rubber-phenolic blends combine the tough-

*American Cyanamid Co. Portion of paper presented before the Chemical Market Research Assn., New York, June 1953.

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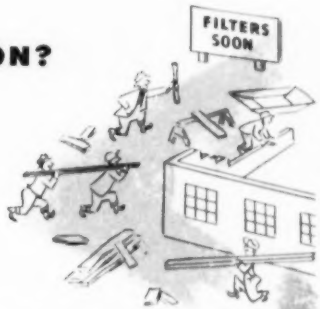

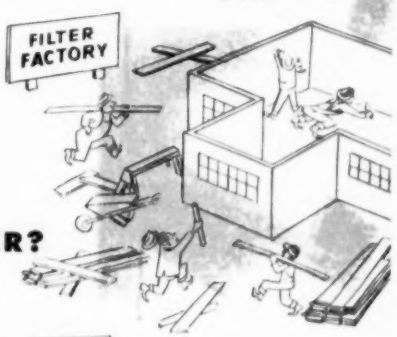

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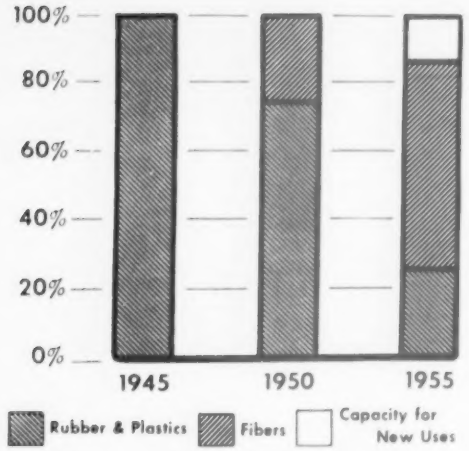
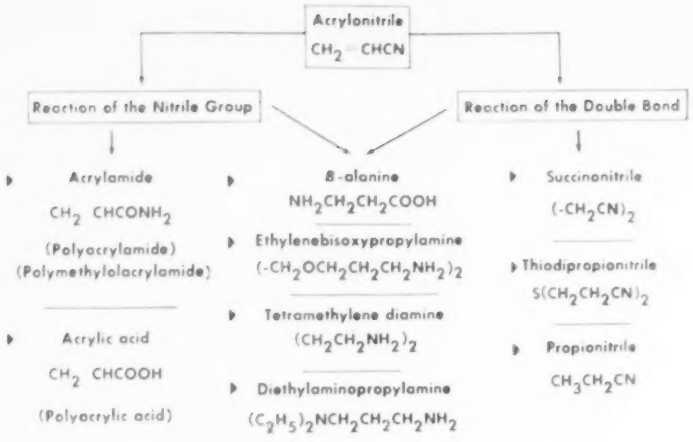


END-USE breakdown for acrylonitrile. Fig. 3.



CHEMICAL INTERMEDIATE preparation constitutes field of new uses for acrylonitrile. Fig. 4.

ness and flexibility of the rubber with the high tensile strength and good surface hardness of the phenolic resin. In particular the ability to successfully mold metal inserts into the final molded object is outstanding. The abrasion resistance of certain formulations is remarkable, in some applications even outwearing steel.

2. The addition of nitrile rubber to polyvinyl chloride-type resins — In a second important new use it was found that nitrile rubbers were compatible also with polyvinyl chloride-type resins and could be used very successfully as nonmigrating plasticizers. Here the permanent plasticizing action of the nitrile contributes flexibility and chemical resistance to the final product.

3. Use of nitrile rubber as a water-dispersed latex—The recent interest in rubber latices has extended to nitrile-type rubbers as finishing agents for leather, and saturents and impregnants for paper and textiles, particularly non-woven fabrics.

Use in textiles . . . These and other developments proceeded satisfactorily until 1948. At about this time it became apparent that a new, very large volume market for acrylonitrile was developing in the textile field.

In 1948, Du Pont announced limited availability of orlon filament yarns. At this time, Union Carbide was making available vinyon N polymers suitable for spinning into filaments. In 1949, American Viscose Co. and Monsanto Chemical Co. announced the formation of Chemstrand Corp. and its plans for the erection of an acrylic fiber plant at Decatur, Ala.

In 1950, Du Pont began operation of the first commercial acrylic fiber plant at Camden, S. C., while Carbide went into semicommercial production of its dynel fiber. By 1952 the Du Pont plant had been expanded to include 30 million pounds a year staple unit while the Chemstrand plant began to get into commercial operation.

In general, these acrylic fibers show unexcelled resistance to sunlight and to outdoor exposure, acids, and most solvents. Recent trends in the textile market indicate their widespread acceptance for such varied uses as men's and women's suiting, sweaters, dresses, curtains, industrial clothing and filter cloths, pile fabrics, blankets, knit jersey, etc.

The commercialization of these various acrylic fibers stimulated and increased consumption and the rapid expansion of acrylonitrile producing facilities. Production of acrylonitrile mounted, and the 1955 production capacity in this country is estimated to be approximately 200,000,000 lb. of acrylonitrile per year.

Cost considerations . . . Fig. 2 shows the past and projected future price structure of acrylonitrile. During the war, the price remained stable. With the close of the war in Europe, the price was reduced as rapidly as possible to stimulate new uses that could move in and occupy the wartime capacity. A low point of 25 cents per pound was reached for a few months during 1946. Soon after that, rising labor and raw material costs dictated a steady increase in price to the current 43 cents per pound.

At this price level it was difficult to predict the large market expansion for acrylonitrile that at one time had appeared possible. Therefore, the work on new methods for the production of acrylonitrile was pushed steadily. As a result of this research and development work a price of 31 cents per pound has been established when the new acetylene-HCN plant goes into commercial production early in 1954. It seems reasonable to assume that with operating experience and processing refinements, even lower costs and prices are a possibility.

End uses . . . Fig. 3 shows a breakdown of uses for acrylonitrile in 1945, 1950 and 1955:

1. In 1945 nitrile-type rubber completely dominated the acrylonitrile market.

2. In 1950 nitrile-type rubber and plastics continued to increase in demand. However, the acrylic fibers began to make an impression percentagewise on the total market demand for acrylonitrile.

3. In 1955, the acrylic fibers will have gained the dominating position in the total market. While the requirements of acrylonitrile for nitrile-type rubbers, various plastics, and acrylic fibers will have increased markedly by this time, ample capacity is foreseen to permit new acrylonitrile uses.

Brief mention should be made here of the increasing commercial activity being shown in the various plastics produced from acrylonitrile. In particular, the acrylonitrile-styrene copolymers, and the acrylonitrile-styrene-butadiene copolymers are attracting interest. For example, the copolymerization of acrylonitrile with styrene yields a copolymer that when compared with polystyrene has:

(1) Increased toughness, (2) improved resistance to abrasion and heat, (3) greater outdoor durability, (4) resistance to oils and solvents, and (5) less after-crazing from unrelieved molding stresses and improved insert reduction.

Chemical intermediate . . . One of the new uses that is expected to require a portion of this 1955 available capacity stems from the use of acrylonitrile as a chemical intermediate. The acrylonitrile molecule is unusual in that it has two strong points of reactivity that

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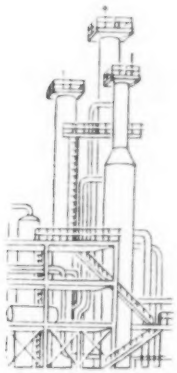

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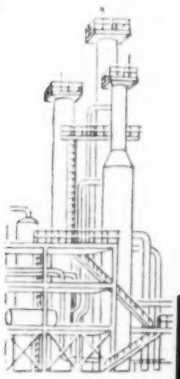

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allow for chemical combination—the double bond and the nitrile group. This is illustrated in Fig. 4 which shows several of the many derivatives that can be made from acrylonitrile.

The chart is divided on the basis of reactions of the double bond, the reactions of the nitrile group, or a combination of both.

1. The nitrile group—Two of the more interesting derivatives which involve the chemical reaction of the nitrile group are acrylamide and acrylic acid. Acrylamide can be made by the acid hydrolysis of acrylonitrile going through acrylamide sulfate. Both acrylamide and several of its interesting derivatives such as methylene bis acrylamide, methylol acrylamide, and the substituted alkyl acrylamides show considerable promise in the resin and plastic field.

Polyacrylamide and polymethylolacrylamide, both water-soluble polymers, are expected to provide strong competition for those markets now enjoyed by carboxymethyl cullulose and polyvinyl alcohol.

Acrylic acid may be produced by the direct hydrolysis of acrylonitrile or from acrylamide. It is currently being offered as a 50 per cent aqueous solution. Among other things it is being utilized as a source of higher acrylate esters. One of its derivatives, polyacrylic acid, another water-soluble polymer, has found very wide acceptance as a warp slashing size for nylon filament. Its marked advantages have enabled it to dominate this field.

2. The double bond—Succinonitrile is of interest in resin production as a source of tetramethylene diamine, pyrolidine, and furmaronitrile, all resin intermediates. Thiodipropionitrile and propionitrile are noted for their solvent properties; Propionitrile as a low-cost solvent and thiodipropionitrile as a selective solvent for the separation of aliphatic and aromatic hydrocarbons.

3. Double-bond and nitrile group—The third group of acrylonitrile derivatives are those which involve reaction of both the double-bond and the nitrile group. Of these, the foremost is beta alanine which is in commercial production as an intermediate in the preparation of a vitamin, calcium pantothenate, which is being used as an animal feed supplement.

Ethylene bisoxy propylamine and tetramethylene diamine have structures suggesting interest as intermediates for fibers, plastics, and pharmaceuticals. Diethylaminopropylamine has found wide acceptance as an amine catalyst for the curing of epoxy-type resins, for example, Shell Catalyst A for Epon resins.

These are but a few of the hundreds of derivatives that can be synthesized from acrylonitrile.

Hydrolyzed polyacrylonitrile or sodium polyacrylate is an interesting water-soluble polymer that can be readily made from acrylonitrile, and while its market potential has not as yet been completely explored, it shows interesting possibilities as a viscosity modifier and stabilizer for water dispersions of both natural and synthetic latices and for other film forming applications. Its use as a soil conditioner has received wide attention. However, to date development work outside of the home use field has not proceeded far enough to evaluate the eventual position these polymers may occupy in the agricultural market.

BOOK

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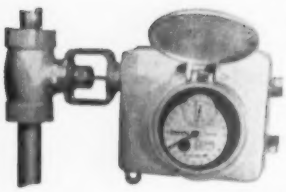

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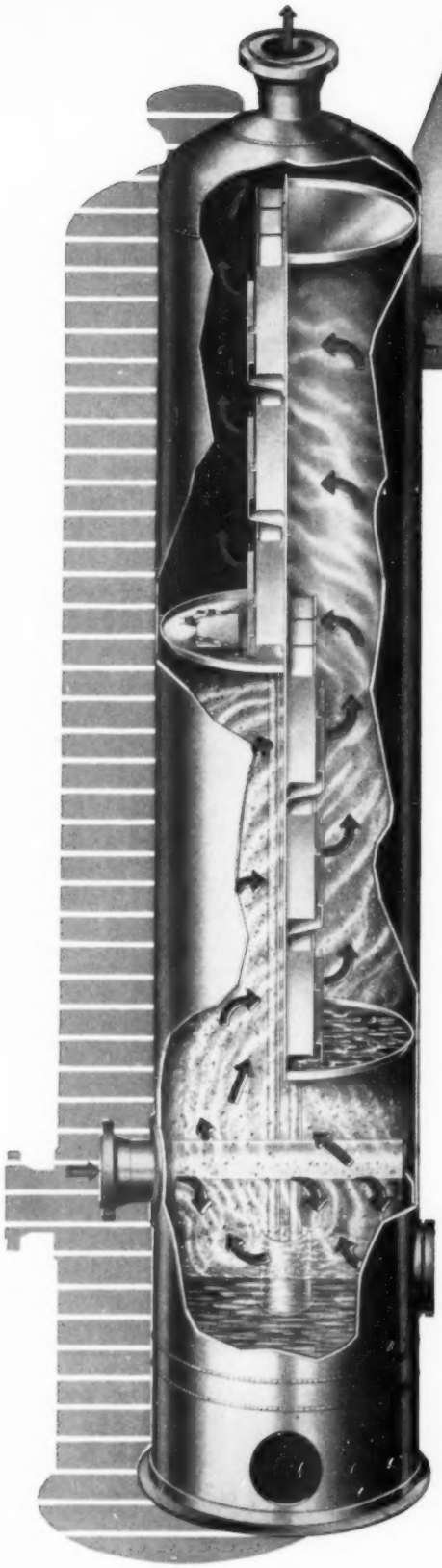

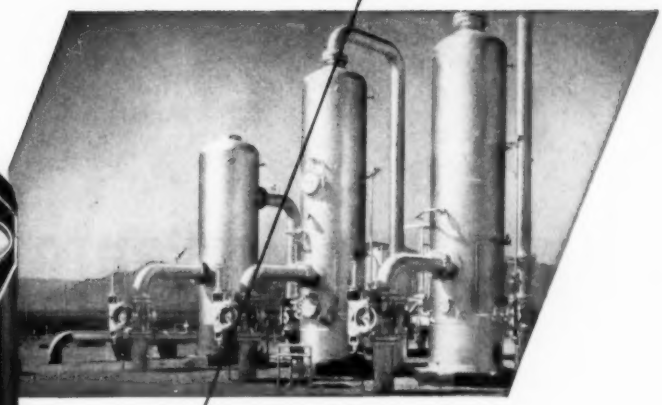

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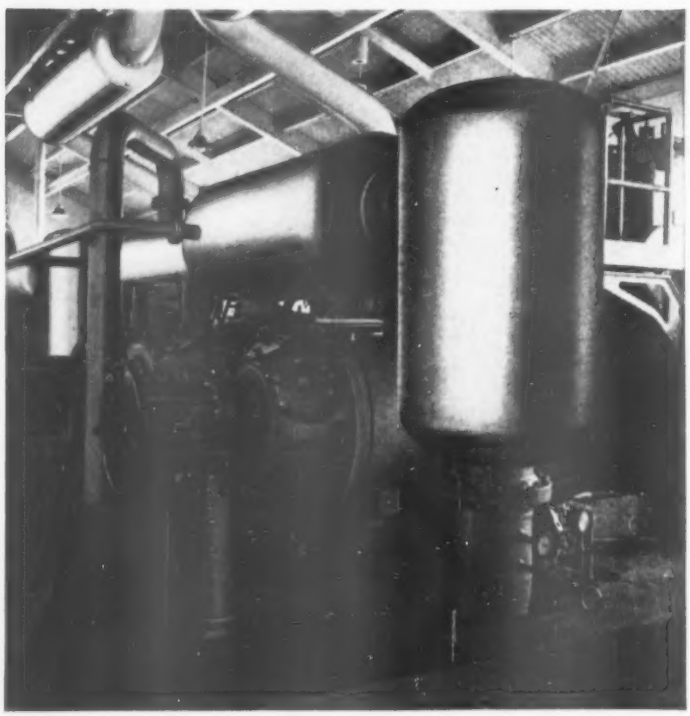

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New Facilities Boost Yield, Improve Quality

(Continued from page 55)

Cat unit instrumentation . . . Principal instrumentation for the El Dorado cat cracker is indicated in Fig. 3. Three air pilot hydraulically operated slide valves are used to control flow of catalyst from standpipes and flow of flue gas from regenerator:

1. Regenerator flue gas slide valve (VPI-1).

Location: In flue gas line from regenerator, just ahead of the expansion chamber.

Function: Control flow of flue gas from regenerator to maintain regenerator pressure.

Actuated by: PdRC-1 which operates on the differential pressure between reactor and regenerator.

2. Spent-catalyst slide valve (VPI-2).

Location: Near bottom of reactor standpipe, between reactor and regenerator.

Primary function: Control flow of spent catalyst from reactor to regenerator in order to maintain cat level in reactor.

Secondary function: Maintain positive head of catalyst to insure no reversal of flow, to prevent air from entering reactor from the regenerator. While flow is from reactor to regenerator, the latter operates at about 8 psi. higher pressure than the reactor. Flow is possible due to the static head provided by the elevation of the standpipe inlet and outlet, and the the density in the dense phase catalyst.

Actuated by: Level controller LRC-1 in reactor.

3. Regenerated catalyst slide valve (VPI-3).

Location: In standpipe between regenerator and carrier line.

Primary function: Control flow of regenerated hot catalyst from regenerator to point of contact with oil charge.

Secondary function: Maintain positive static head of catalyst to insure no reversal of flow.

Actuated by: TRC-2 which controls reactor temperature.

An Askania central hydraulic pressure system is provided for operation of the three slide valves. Hydraulic oil is piped to each slide valve where it actuates the valve upon impulse from the controller. A special low-pour, rust-inhibited oil is employed. Entire piping must be acidized before use to remove mill scale and rust which might plug the orifices in the system. Oil screens are provided at each valve.

Position of slide valves is shown continuously by the valve position indicators on the board. The regenerator flue gas slide valve is a double-disk valve, one disk set manually with hand wheel and the other positioned hydraulically.

A Hays oxygen recorder is provided to give a continuous record of oxygen content of the flue gas.

Alarm system . . . Red light and horn alarm are provided if any of 13 process variables are upset. Alarm will operate on:

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2. Regenerated - catalyst slide valve low differential pressure.
3. Regenerator high temperature.
4. Main air blower lube-oil low pressure.
5. Instrument air low pressure.
6. Main column overhead receiver high pressure.
7. Main column overhead high level.
8-11, inclusive. Compressors jacket water high temperature.
12. Compressor interstage receiver high level.
13. Cracking unit charge-drum low level.

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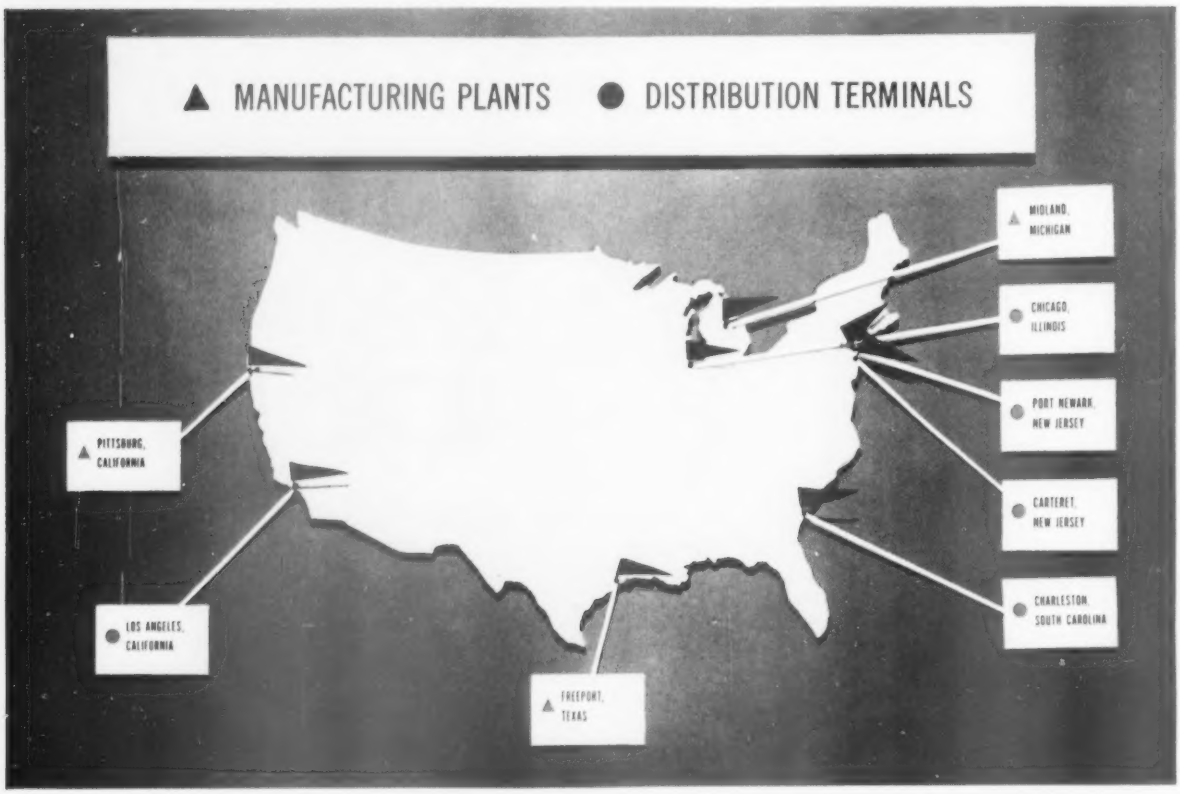

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Reactor pressure may be controlled by setting PRC-1 located above the main column overhead receiver. The reactor pressure is the sum of the pressure at the suction of the first-stage gas compressors and the accumulated pressure drops through reactor, cyclones, main column overhead condensers, and piping.

Air blower . . . Regeneration air is furnished by a centrifugal compressor driven by a 2,000-hp. 4,160-volt electric motor. Blower is designed for 14,800 cu. ft. of air per minute at discharge conditions (17,500 cu. ft. at suction conditions). Air discharges at about 250° F.

The blower is a four-stage centrifugal machine with geared speed increaser which boosts r.p.m. from 1,750 to 5,400. Turbine is equipped with a main oil-circulating pump operating from the pinion shaft, twin oil coolers, and twin oil filters. It is also equipped with a motor-driven auxiliary oil pump which automatically cuts in at low oil pressure and is also used when starting and stopping the blower. An alarm sounds on the instrument board any time the auxiliary oil pump starts up.

Cat Cracker Fractionation Section

The main column is 7 ft. 6 in. by 48 ft. with 16 trays. The lower 27 ft. is lined with 11-13 chrome. The upper trays are alloy bubble decks; the lower five are alloy side-to-side pans. The center well accumulator and drawoff tray are located between trays 8 and 9 for light-cycle-oil drawoff. Another drawoff at twelfth can be used for heavy recycle stream at later date. Overhead vapors from the reactor enter the main column about 3 ft. below the lowest pan at a temperature of 10°-20° F. below the reactor temperature. Column bottoms (slurry oil) which have been cooled by circulating a portion as reboiler oil in the gas concentration and poly units and as heat medium through the column bottoms steam generator, are refluxed over the lower five side-to-side pans to cool entering vapors. In addition to the cooling effect, this stream washes entrained catalyst from the pans down to the bottom of the column and this entrained catalyst is eventually returned to the reactor along with the recycle bottoms. Buildup of catalyst at the bottom of the column is prevented by a 2-in. steam spray ring which keeps the catalyst agitated and prevents plugging of the bottom drawoff.

A temperature recording controller operates on the temperature in the overhead vapor line. This operates a motor valve with valve positioner which controls quantity of material returned as reflux. The level in the overhead gasoline receiver is controlled by a level controller which regulates quantity of distillate going to the primary absorber. The gasoline receiver is divided into two sections by a baffle. The inlet portion acts as a gasoline receiver, the outlet portion as the compressor suction drum.

Gas-Concentration Section

Liquid from the main column overhead receiver is pumped to primary absorber on level control, as noted. PRC-1 controls the governor of the four-cylinder compressor, changing the speed to hold the proper pressure. Other compressors are put on or taken off line as necessary to handle gas flow. PI-1 is located at the compressors and shows instrument air pressure from PRC-1 and will indicate to operator if compressors are properly handling gas. PIC-1 is also located on main

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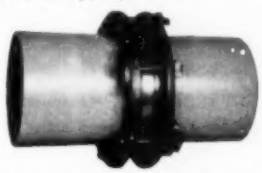
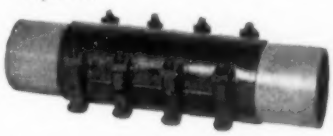


For repairing leaks in circumferential welds. *Porous Weld Clamp*, Style 55.



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column overhead receiver. This opens a butterfly valve in the line to the blowdown sump in case of excess pressure. The same controller also opens a steam valve into the blowdown sump at the same time. PRC-1 will, in cases of low suction pressure to the compressors, operate a spill-back line from the compressor interstage receiver back into the first-stage section in order to maintain proper pressure. The board mounted alarm AL-3 is actuated by PRC-1 to indicate high receiver pressure and this alarm will sound before the butterfly valve opens to the blowdown sump.

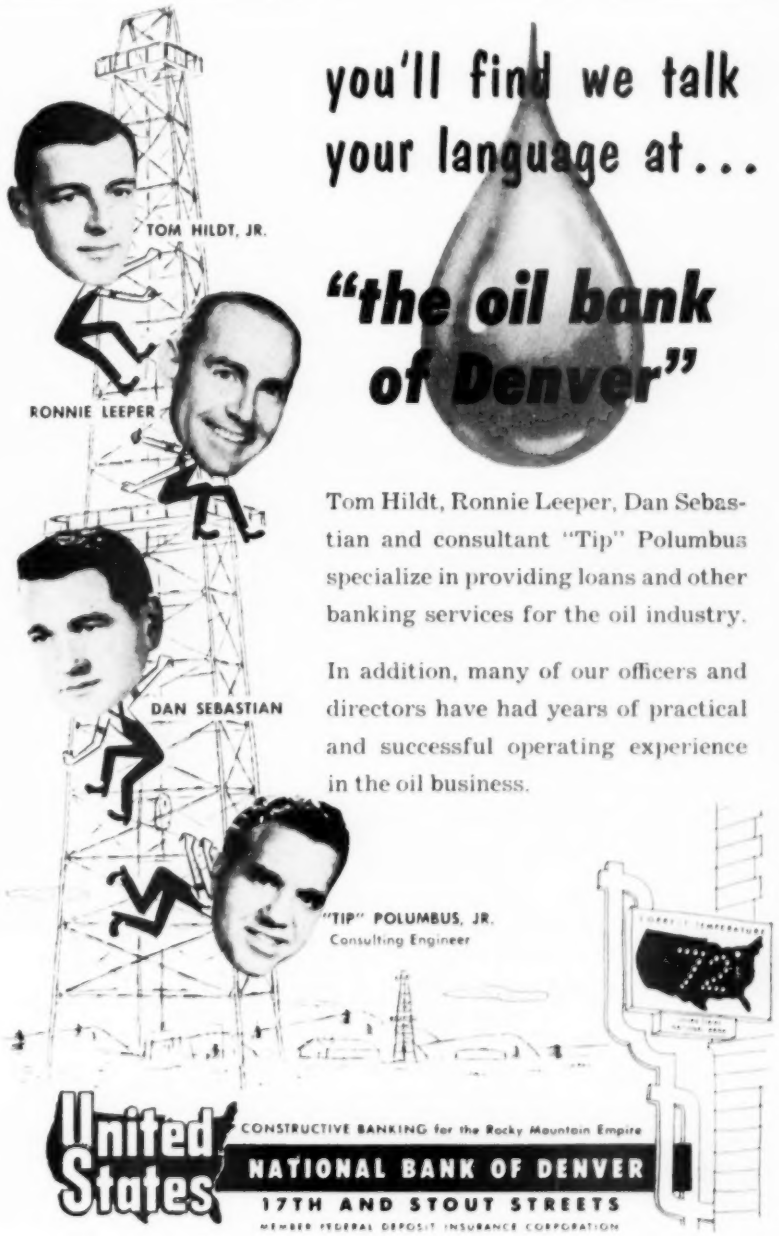
Stripper charge drum . . . This receives: (1) compressed gas from compressor second stage, (2) overhead gas from stripper, (3) gas from thermal stabilizer, (4) liquid from compressor interstage receiver, and (5) thermal cracker stabilizer and primary absorber bottoms. Liquid from the drum is the charge to the stripper and is pumped to the top of the stripper tower. Flow of bottoms from the stripper charge drum may be controlled by the liquid level in the charge drum or the flow controller from the stripper charge drum. Both level and flow indication are on board and a switch is provided to control from either point.

Primary absorber . . . This vessel is 3 ft. 6 in. by 56 ft. with 24 alloy bubble decks. Feed is from the stripper charge drum. Absorption liquid is unstabilized gasoline from the main column receiver. The primary absorber operates at approximately 200 psi. pressure and the absorbing liquid picks up from the gases most of the propanes and butanes which are recovered plus some ethanes and lighter gases. The overhead gas from the absorber tower flows to the lower section of the sponge absorber. The rich oil from the absorber is pumped, on level control in the absorber, to the stripper charge drum.

Stripper . . . This is the 3-ft. 6-in. by 30-ft. section of the combination stripper-sponge absorber tower, containing 12 alloy bubble decks. It is fed from the stripper charge surge drum. The overhead gases are returned to this drum ahead of the precooler. The stripper tower is equipped with an external reboiler (combination reboiler and reboiler exchanger). This combination reboiler contains two sets of tubes and two weirs forming a central accumulator from which the bottoms are withdrawn. The reboiler section is heated by steam, the flow of which is regulated by a temperature controller, operating on temperature in stripper. Reboiler exchanger section exchanges heat with debutanizer bottoms.

Sponge absorber . . . The lower section of the stripper-sponge absorber tower is 3 ft. 6 in. by 20 ft. with eight alloy bubble decks. Overhead gas from primary absorber is fed to this section. The lean oil from the sponge absorber is the light cycle oil from the main-column side stripper. The sponge oil flows from the stripper through the sponge-oil cooler where it is pumped by a lean-oil pump to the sponge absorber. This flow is regulated by a flow recording controller which controls steam flow to the reciprocating pump. Overhead gas from the sponge absorber goes directly to refinery fuel-gas system. Bottoms from this sponge absorber are returned to the main fractionator column with flow controlled by level in the bottom of the absorber.

Debutanizer . . . This is 4 ft. in diameter by 68 ft. with 30 alloy bubble decks. Feed is from the bottom of the stripper tower. The debutanizer reboiler is heated by circulating bottoms from the main fractionator. Debutanizer bottoms flow first through the stripper reboiler exchanger where heat is exchanged with bottoms of stripper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tower and from there to debutanizer bottoms cooler. Flow from the cooler is controlled by liquid level on the debutanizer bottoms reboiler. Flow from cooler is direct to treating and storage and represents final cat gasoline made from entire unit. A sidestream takes off, after the debutanizer bottoms cooler, to the fractionation section where it may be used as a reflux on main column when necessary or in raw oil charge. Flow from debutanizer overhead through the receiver is regulated by a pressure controller with bypass of a portion of material around the condenser direct to the receiver to maintain pressure in debutanizer.

Gas-Well Deliverabilities Stepped Up

(Continued from page 57)

acid in small slugs, separated by small volumes of high-pressure gas in the tubing lowers the hydrostatic head when acid is recovered. Expansion of the high-pressure gas displaces each slug of acid from the tubing before the succeeding slug of acid enters the tubing from the sand face. This permits very rapid recovery of the acid, a major factor in the effectiveness of this treatment preventing neutralization of the acid in the formation. Under conventional methods it would have been necessary to swab back the acid.

When the well is opened up after completion of the acid job, it will clean itself without having to resort to swabbing. The gas appears like a mist. Since the acid was separated into small slugs by the high-pressure gas stream, each slug of acid is ejected from the tubing before the next slug enters the tubing. The effect is like a series of corks popping out of a toy gun.

Reservoir conditions . . . Subject well was recompleted in Sand "A," a Frio (Oligocene) sand exposed through casing perforations from 6,714-36 ft. Average porosity was 22.8 per cent, average permeability 521 md., and average pressure 2,750 psia. Reservoir temperature was 196° F.

Injection Well Treating

Some of the wells utilized for gas injection in the La Gloria reservoirs are completed below the gas-water contact. Attempts in the past to improve injectivity employed conventional acidizing techniques were not successful.

Since the well was completed below the gas-water contact, it would flow salt water after workover. Then the gas was turned back into the formation; however, as a rule there was little increase in injectivity reported.

New procedure . . . At La Gloria, the first step in the procedure used to treat an injection well is to introduce high-pressure gas into the well **ahead of the acid.** This technique is considered necessary to prevent dilution of the acid directly from the salt water, since perforations are made **below** the gas-water contact.

In the second step, mud acid is introduced followed with displacement by gas. After 1 hour had elapsed from time acid was placed into the formation, well-head pressures reached a maximum and pressures broke sharply thereafter.

Before treatment, the maximum gas volume that the Frio formation would take in the particular well studied was only 2 million cubic feet; this was at a well-head injection pressure of 3,000 psig. After treatment, the formation took 19 million cubic feet of gas and the injection pressure dropped to 2,850 psig. or less.

Reference

1. Justice, W. H., and Jens P. Nielsen, "Improved Techniques Developed for Acidizing Gas Producing and Injection Wells," T. P. 3457, Vol. 195, 1952, p. 285.

2. Muskat, M., "The Flow of Homogeneous Fluids Through Porous Media," McGraw-Hill Book Co., New York, 1937, pp. 422-424.

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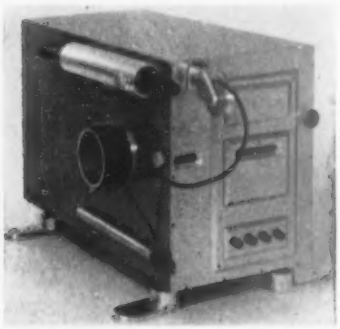

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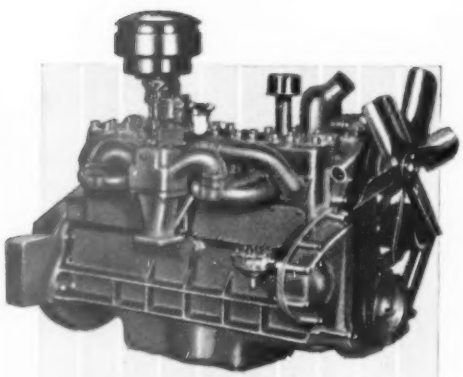
Pedigreed Horsepower digs ditch, carries dirt away, moves ditcher!



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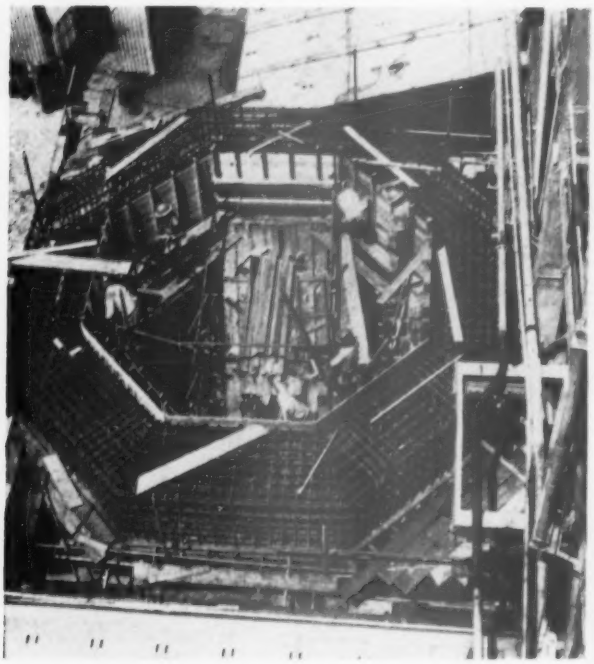
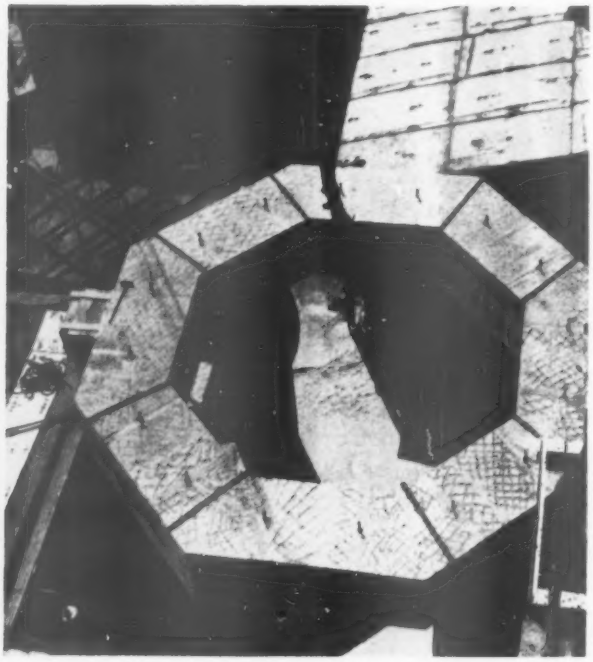
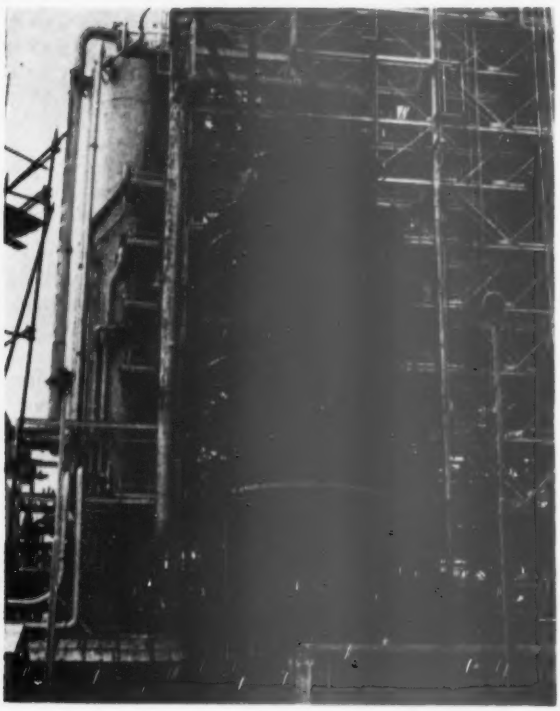
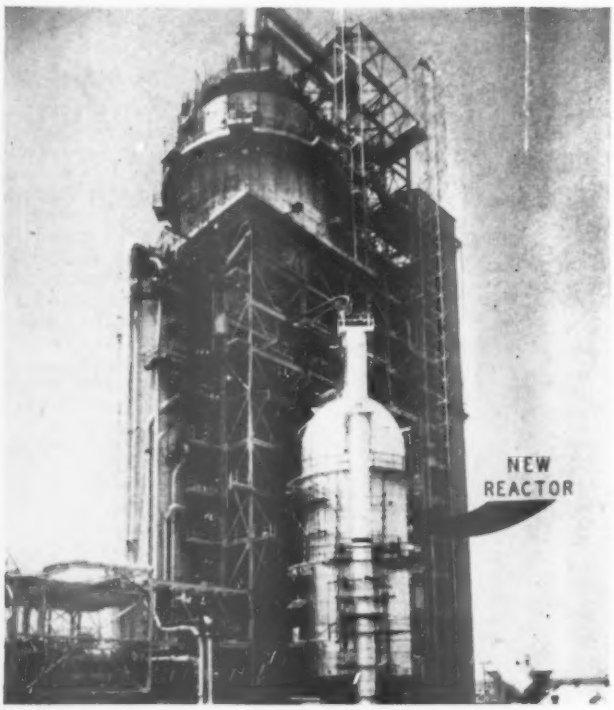


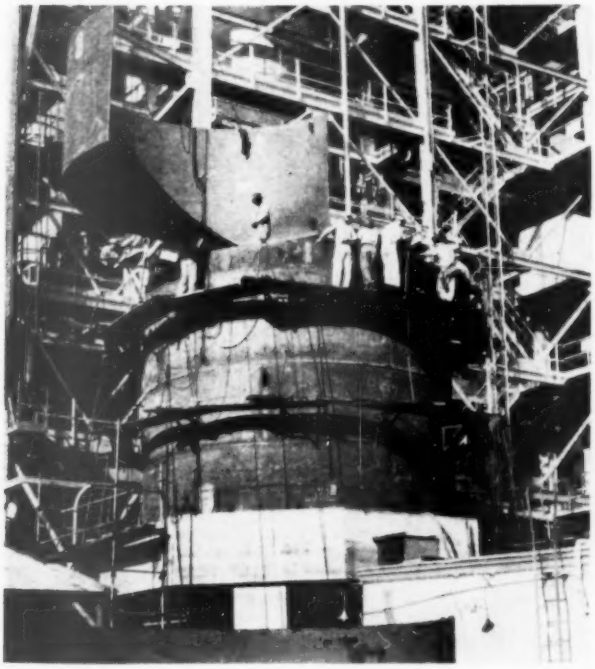


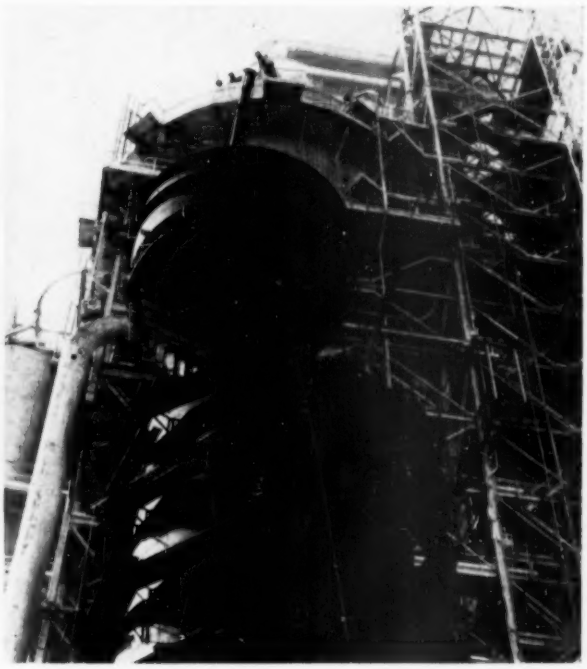
This new cat-cracking reactor . . . →





of existing cracker . . . without downtime





goes up . . . near framework . . .

A NEW reactor for the catalytic cracking unit at the refinery of Lago Oil & Transport Co., Ltd., at Aruba, N.W.I., was recently constructed using a portion of the existing structure as framework, and without any downtime on the unit.

The completed reactor was tied into the unit during a regular turnaround and the old reactor is being used as a catalyst-storage hopper. Two years of careful planning went into the construction.

Old one cracks . . . Evidence that the original reactor to the unit would have to be replaced appeared during the 1951 turnaround when small cracks resulting from the two-ply construction on the metal shell were discovered.

Repairs made then and again in 1952 kept the reactor in good working order but in the meantime intensive planning began for replacing it.

Taking the old one out would have been too costly and time-consuming (9 to 12 months with the unit out of service) so the decision was made to build the reactor outside the unit. In this way, production was maintained during the 8 months it took to build the new reactor and prepare the cat unit to receive it.

CONSTRUCTION WORKERS install insulation on the new reactor.

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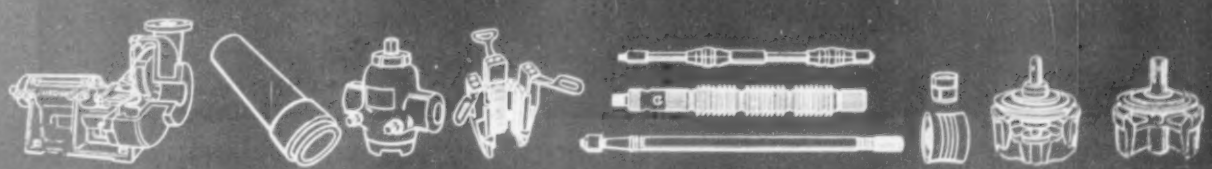

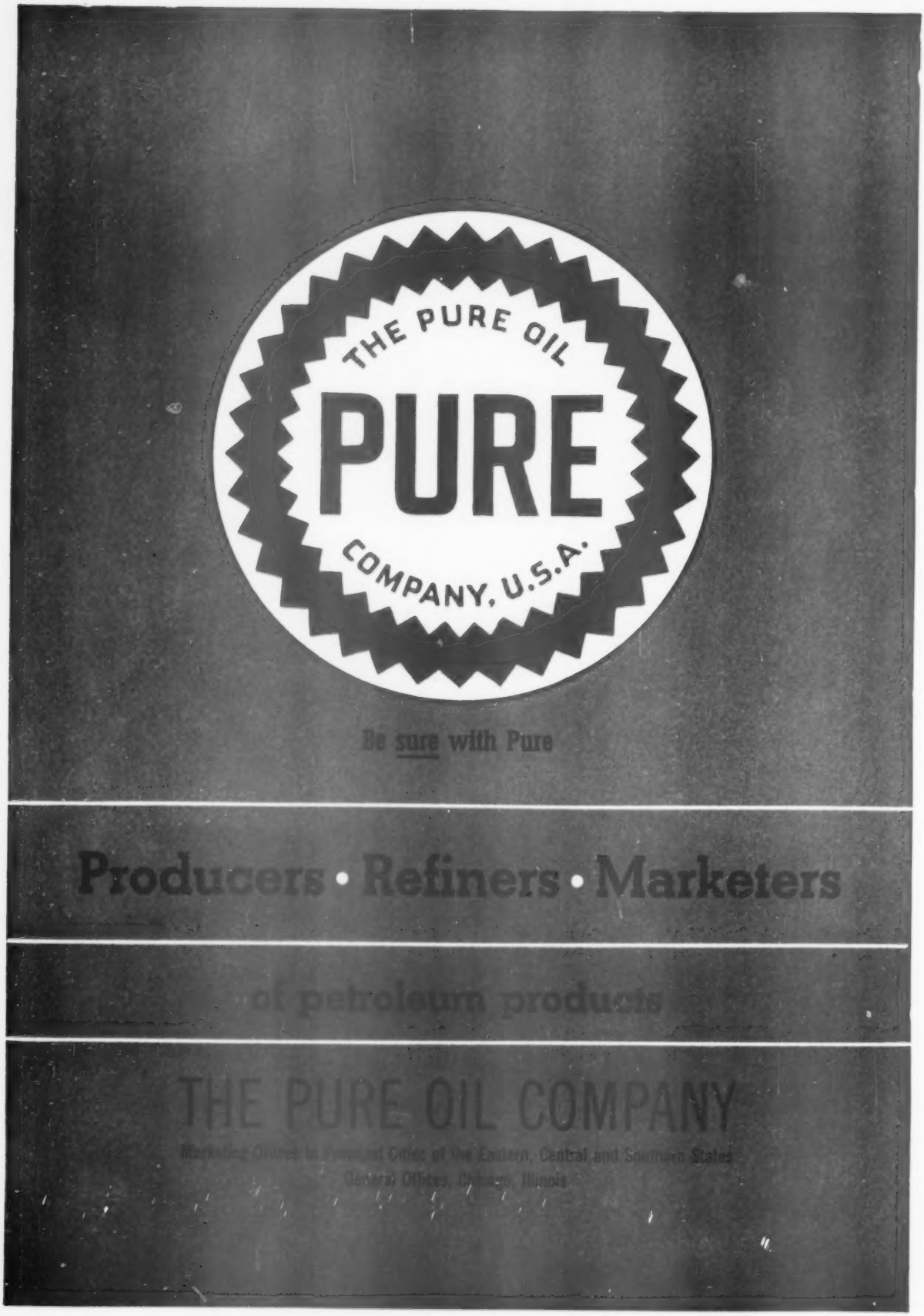
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PUMP SELECTION—6

Specifying Suction and Discharge Conditions

by Robert L. Jacks*

CONTINUING with the more important items which are entered on the pump specification sheet, this installment deals with flow rate and suction and discharge conditions.

F. Quantity handled . . . Pumps are designed on the basis of the maximum rather than the normal flow rate to be handled and this maximum is the value reported on the specification sheets. In the absence of specific information, the maximum can be taken as 10 per cent above the normal flow rate for streams to storage and 20 per cent above the normal for streams to operating equipment (reflux, recycle, feed, etc.). For purposes of establishing limiting conditions, the minimum flow is also a necessary design factor although not itself reported on the specification sheet. Generally, it is unsatisfactory to operate a centrifugal pump at less than 20-30 per cent of its rated capacity and pumps developing high heads should not be operated at less than 30-40 per cent of rated capacity. Otherwise, such undesirable effects as overheating and seizure may occur. For wide ranges of flow, this may mean provision of circulation lines around the pump to obtain satisfactory operation.

G. Suction conditions at pump . . .
1. Pressure: The suction pressure is evaluated by subtracting the maximum line and equipment friction pressure drops in the suction system from the upstream pressure at the point of constant pressure level such as a drum or tower. The difference in the elevation of the liquid at the upstream point of constant pressure and the center line of the pump suction should also be taken into account. Suction pressure is usually reported as pounds per square inch gage unless partial vacuum necessitates absolute units. Suction lines should be designed for low friction losses in most cases and for this reason they are usually a size or two larger than the discharge lines (see "N.P.S.H." below). For evaluation of pressure drops, the same considerations apply as are described under item "H" below on "Discharge Conditions."

2. Vapor pressure: The vapor pressure of the fluid being pumped is determined at the pump suction temperature for calculation of the net positive suction head. In the case of a material withdrawn at its boiling point from a tower or vessel, the tower or vessel pressure is taken as the vapor pressure of the material.

3. N.P.S.H.: The net potive suction head above vapor pressure is the difference between the absolute suction pressure and the vapor pressure at the pump suction temperature. There are many pumps purchased with N.P.S.H. requirements as low as 6-8 ft. for horizontal centrifugal pumps and down to 1 ft. for vertical centrifugal pumps. However, such requirements call for special pump design and are therefore more expensive. Wherever possible, therefore, the N.P.S.H. should be 10 ft. or more for pumps up to 500 g.p.m. capacity and 20 ft. or more from 500 to 2,000 g.p.m. This is especially true if loss of suction on the pump will upset the operating conditions in the plant, and careful consideration should be given to possible variations in the vapor pressure of the pumped material if the N.P.S.H. is near the minimum. Taylor[1] has given a discussion of the N.P.S.H. problem which outlines possible solutions for low N.P.S.H. conditions. (Note: It is also good practice to specify 25 ft. maximum N.P.S.H. for pumps which have no N.P.S.H. problems. In doing so, the pump is more adaptable to higher throughputs without N.P.S.H. limitations or may be used more readily in other services.)

H. Discharge conditions at pump . . .
1. Pressure: The discharge pressure is evaluated by adding the maximum line and equipment pressure drops in the discharge system to the downstream pressure at the point of constant pressure level, again taking into account static head. The pressure is reported in the same units as the suction pressure. In the evaluation of the pressure drops, the following rules apply:

a. The friction losses through lines and exchangers at normal flow are usually increased by the ratio of maximum to normal flow squared. Thus, the ΔP for a maximum flow 20 per cent above normal is $(1.20)^2 \times 100 = 144$ per cent of the normal ΔP.

b. The pressure drop through a control valve must be calculated at maximum flow. The pump and valve designs should be coordinated to obtain the greatest efficiency commensurate with good control. In the absence of any data on the valve, a rough estimate of the ΔP can be made by assuming $\Delta P = 20$ per cent of the friction loss in the system plus 10 per cent of the static head against which the system operates.

c. The permanent loss through an orifice is taken as 3 psi. which corresponds to a 100-in. range tube —the most common type employed on meters.

d. For purposes of calculating potential head due to differences in elevation, the suction and discharge ports of all pumps are figured to be 3 feet above the level of the ground (or the supporting platform).

Reference

1. Taylor, Irving, Chemical Engineering Progress, 44, 336-338, (1948).

*Esso Standard Oil Co., Louisiana Division, Baton Rouge. Excerpt from paper in Chemical Engineering Progress, May 1953, page 235.

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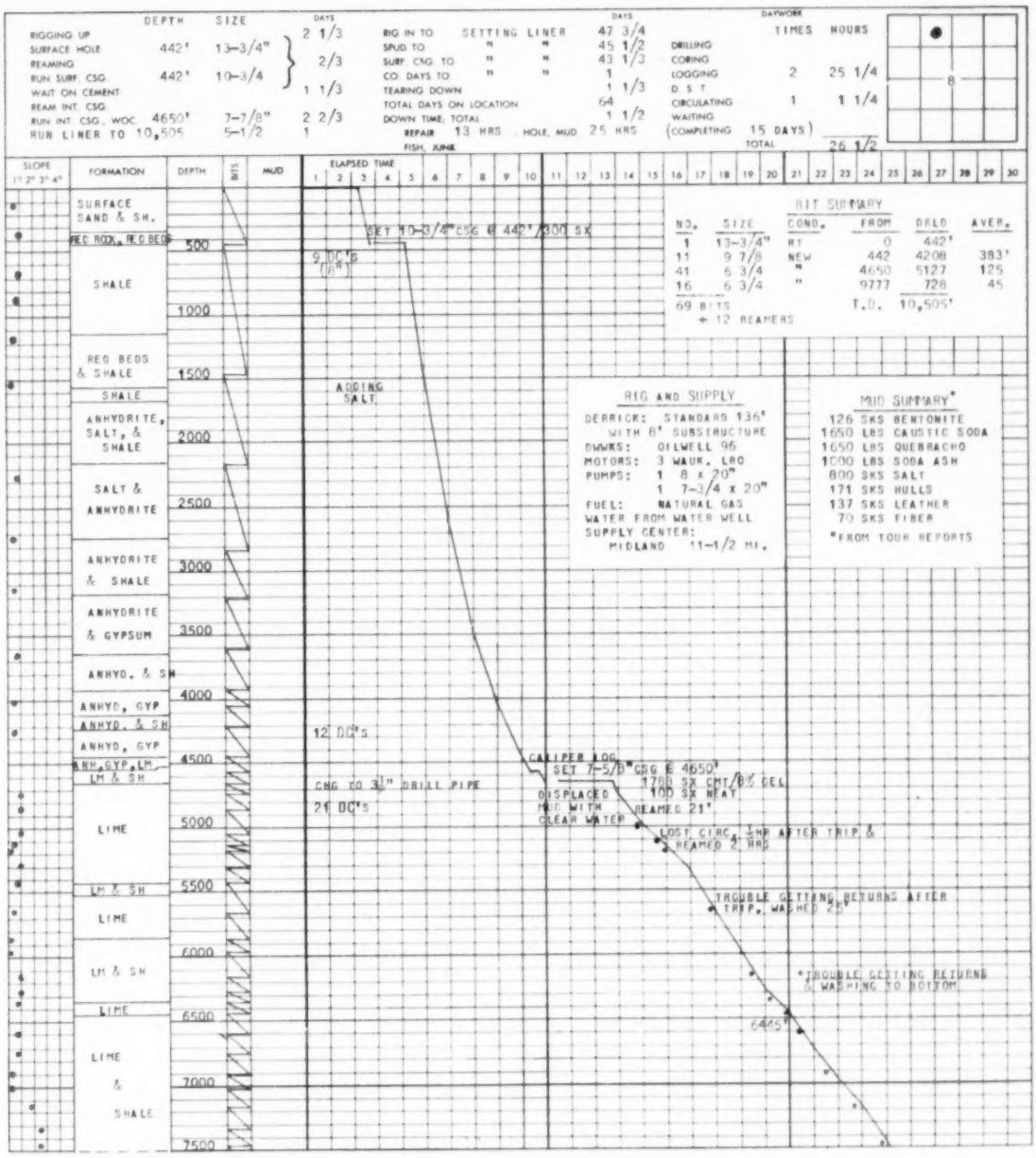
Operator: Magnolia Petroleum Co.
Well: 4 H. F. Timmerman
Location: Section 8, Block 40, Township 3s, T&P Survey, Parks field, Midland County, Texas.



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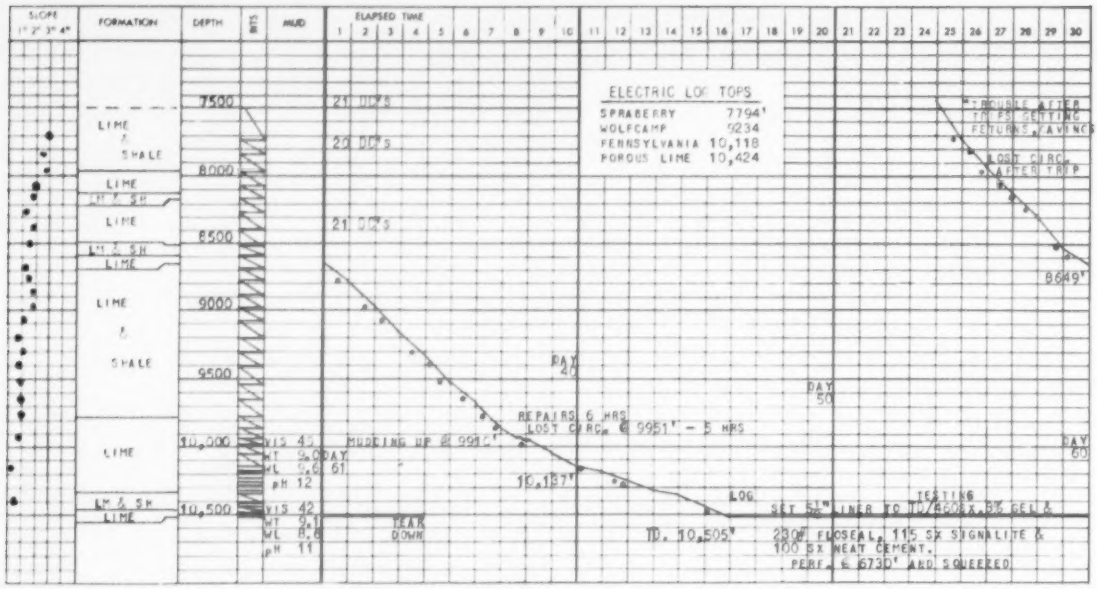


Use and Care of Wire Rope—12*

Lubrication . . . To maintain a wire rope in top operating condition it must be correctly lubricated. It is made up of many moving parts and a lubricant is needed, not only to reduce friction between wires composing the rope . . . between the rope and the material on which it runs, but also to cover the wires and protect them from external corrosive agents. Internal lubrication not only reduces abrasion but promotes flexibility, which is a most important feature with fast-moving ropes.

APPROXIMATE AMOUNT OF LUBRICANT NECESSARY TO COVER 1,000 FT. OF WIRE ROPE

Rope diam. (in.)	Amount lubricant (lb.)	Elevator compound (lb.)	No. 1 and No. 5 (lb.)	No. 2, No. 3, No. 13 and No. 14 (lb.)
½	8	4	8	10
⅝	12½	4½	9	11¼
¾	18	5	10	12½
⅞	24½	5¾	11½	14¾
1	32	6½	13	16¾
1⅛	40½		15	18¾
1¼	50		17¼	21½
1⅜	60½		22	24

Maintaining the lubricant in sufficient amount prevents the entrance of water or acids. If the rope has a fiber core and it is allowed to dry out, the core will absorb this moisture to the detriment of the inside wires.

* Taken from Bulletin 61, Use and Care of Wire Rope, A. Leschen & Sons Rope Co.

Under present methods of manufacture, the strands are completely filled with lubricant as they are formed. The fiber cores are not depended upon to feed lubricant to the wires while in service. Actually severity of modern working conditions squeezes out what lubricant there is in and around the core and this can only be replaced by outward applications. It is, therefore, very important to apply lubricant at regular and frequent intervals. The exact time interval can only be determined by experience. On certain installations, such as shaft mine hoists, it is possible and desirable to maintain a continuous application by slowly dripping the lubricant onto the rope where it passes over the head sheave.

Specifications of the ideal lubricant are to an extent contradictory, but it is obvious that to be effective, whatever lubricant that is applied externally must penetrate, so as to replace the original lubricant which is being continually forced out. If one of the heavier bodied products cannot be applied hot, a thinner one must be used.

It is always best to start replacing the washed and worn-off lubricant and protector before moisture gets into the rope. After moisture has once penetrated, no good is accomplished by sealing it in with a heavy compound. A rope that has become coated with caked lubricant and dirt should be cleaned to facilitate penetration of the lubricant.

A number of handbooks and special articles are available that may be consulted for the details of the mechanics of application. Running ropes can be passed through a trough, if horizontal, or a variety of open-top containers, if vertical. A bunch of waste or other similar material is placed around the outlet, to wipe off the excess. If a sheave is convenient, some users prefer to pour the lubricant in the groove as the rope passes under the sheave; or onto the rope itself at that point, if it passes over the sheave. Under certain conditions it may be found more convenient to brush the lubricant on as the rope is slowly advanced, or when it is stationary, as on a drum.

The principal function of externally applied lubricant is to keep the original supply replenished and to maintain full lubrication and protection for the longest period possible. It is not expected to flow into the fiber core after the rope has been put into service, but it should penetrate to the core. All lubricants must be free from acid, as one function of the lubricant is to protect the wires from the attack of acids.

A thinner lubricant is necessary for use on a rope with fine wires such as 6 by 37, than for a 6 by 7 rope. The temperature, also, is a factor in determining the type of lubricant to be used. A thinner grade must be used in winter or a heavy grade should be applied hot.

Part 39 of a series

by Dr. B. E. Lauer, Head, Department of Chemical Engineering, University of Colorado

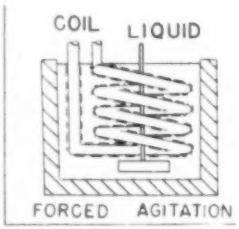
h_f HEAT TRANSFER

COEFFICIENT of HEAT TRANSFER through FILM between OUTSIDE of a COIL and a LIQUID

Liquid Movement: Forced Convection - turbulent

Coil Shape: Helix

Heat Movement: Heating or Cooling



EQUATION:

$$h_f = 0.87 \frac{k}{D}\left[\frac{L^2 N \rho}{\mu}\right]^{0.62}\left[\frac{C\mu}{k}\right]^{0.33}\left[\frac{\mu}{\mu_s}\right]^{0.14}$$

TERMINOLOGY:

h_f - Film coefficient of heat transfer, BTU/hr. sq. ft. °F.

k - Thermal conductivity, BTU/hr. sq. ft. °F./ft.

D - Inside diameter of vessel, ft.

C - Specific heat at average temperature, BTU/lb.°F.

μ - Viscosity at average liquid temperature, lb./hr.ft.

μ_s - Viscosity at coil temperature, lb./hr. ft.

L - Length of paddle, ft.

N - Agitator speed, rev./hr.

ρ - Density of liquid at average temperature, lb./cu. ft.

USES:

Used when coil is immersed in agitated liquid in jacketed vessel.

LIMITATIONS:

Applicable for flat paddle only.
Recommended for use with vessels of less than 5 ft. diameter.

$400{,}000 > (L^2 N \rho/\mu > 300$

PHYSICAL CONSTANTS: The values of the physical constants such as density, viscosity, and others are reported in the International Critical Tables, in several handbooks, and in the technical literature.

Page references in the Chemical Engineers' Handbook, J. H. Perry (1948) are as follows:

for ρ - 130-148, 178-195, 1583.
μ - 370-374, 1198, 1696.
k - 459-461, 1303, 1697.
C - 225-238, 297, 1586, 1696.

REFERENCES:

1. T. V. Chilton, T. B. Drew, R. H. Jebens, Ind. Eng. Chem., 36, 511 (1944)
2. Chemical Engineers' Handbook, J. H. Perry, p. 474.
3. Process Heat Transfer, Kern, p. 718.

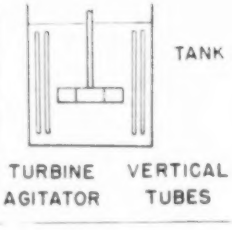
M 2 c (2)

COEFFICIENT of HEAT TRANSFER through FILM between OUTSIDE of a COIL and BAFFLES

Liquid Movement: Turbulent by agitation

Coil Shape: Vertical tube bank

Direction of Heat Movement: Heating or Cooling



EQUATIONS:

12" - 6 blade turbine

Heating - $h_f = 0.00285 \frac{L^2 N \rho}{\mu}$

Cooling - $h_f = 0.00265 \frac{L^2 N \rho}{\mu}$

12" - 4 blade turbine

Heating - $h_f = 0.00235 \frac{L^2 N \rho}{\mu}$

Cooling - $h_f = 0.00220 \frac{L^2 N \rho}{\mu}$

TERMINOLOGY:

h_f - Film coefficient of heat transfer, BTU/hr. sq. ft. °F.

L - Diameter of turbine, ft.

N - Agitator speed, rev./hr.

ρ - Density of water at average temperature, lb./cu. ft.

μ - Viscosity of water at ave. temperatures, lb./hr.ft.

LIMITATIONS:

Equations developed in vessel 4 ft. deep.

Agitator 2 ft. from bottom of tank. Tube coil - 4 banks of 4, 1" tubes.

PHYSICAL CONSTANTS:

The values of the physical constants such as density, viscosity, and others are reported in the International Critical Tables, in several handbooks, and in the technical literature.

Page references in the Chemical Engineers' Handbook, J. H. Perry (1948) are as follows:

for $\frac{\rho}{\mu}$ - 130-148, 178-195, 1582.
370-374, 1198, 1696.

REFERENCES:

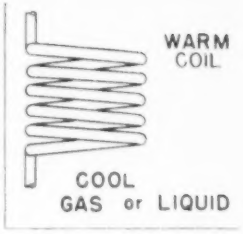
1. J. H. Rushton, E. B. Lichtman, and L. J. Mahoney, Ind. and Eng. Chem., 40, 1082 (1948).
2. Process Heat Transfer, Kern, pp. 718.

M 2 c (2)

COEFFICIENT of HEAT TRANSFER through FILM between SURFACE of a WARM COIL and a COOL GAS or COOL LIQUID

Fluid Movement: Natural convection - Turbulent

Coil Surface: Inside or Outside



Reference should be made to equations

M 1 c (1)
M 2 a (2)
M 2 c (1)
M 2 c (2)

for equations applicable to heating a gas or liquid by passing it over or through a heated coil.

M 4, 5 a, c

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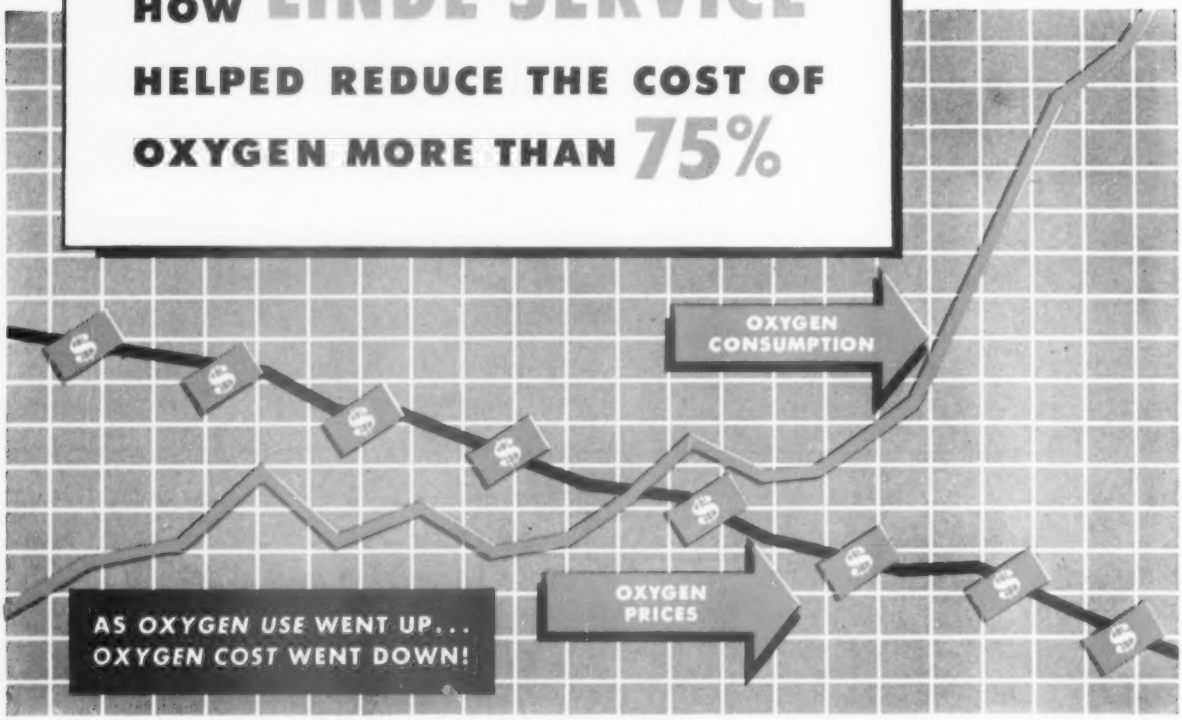

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SIZING CONTROL VALVES—4

Allowable Pressure Drop Factor

by G. F. Brockett* and C. F. King*

FIG. 1 is a replot of the basic data on Fig. 2 (Part 3 of this series, July 27) with "one minus critical pressure ratio" as abscissa. The expression "one minus critical pressure ratio," which might also be written "ratio of pressure differential to absolute inlet pressure," has been designated as "allowable drop factor" or K_L. Since:

$$K_L = \Delta P / P_1$$

where:

K_L = allowable pressure drop factor from curve.
ΔP = pressure differential at critical pressure ratio in psi.
P_1 = inlet pressure in psia.

We may write:

$$\Delta P = K_L (P_1)$$

To illustrate how this formula may be used in the solution of a water-flow problem, assume:

Inlet pressure = 120 psia.
Pressure drop = 60 psia.
Inlet temperature = 300° F.
Saturation temperature for 120 psia. = 341° F.
Δt = 341° — 300° = 41°.

From curve Fig. 2 (Part 3):

$$K_L = 0.38$$

Therefore, the allowable pressure differential equals (0.38) (120) = 45.6 psia. Thus, if the control valve is being sized by use of the formula:

$$Q = C_v (\Delta P / G)^{1/2}$$

or, with a slide rule, nomograph, or capacity table based on this formula, 45.6 psi. should be used as the ΔP value, rather than 60 psi.

If the pressure drop in this problem had been less than 33.6 psi., the actual pressure drop should have been used.

Note that the allowable pressure drop factor curve in Fig. 1, this installment, asymptotically approaches the value of 0.75. From this we can conclude that globe bodies handling water should not be sized for pressure differentials greater than 75 per cent of the absolute inlet pressure.

In order to compare results obtained by this method of sizing with the so-called "heat balance" method discussed earlier in this series, Fig. 2 was plotted. These curves pertain to data on a 2-in. double-ported globe body with a plug-type inner valve and inlet pressure of 100 psia. and temperature of 315° F. The dashed line represents actual test data, and the solid lines illustrate the deviation from actual capacities that would be indicated by the heat-balance method, assuming 50 and 100 per cent flash in the body. Assuming 50 per cent flash, the heat-balance method could indicate a capacity 27 per cent too high or 41 per cent too low, depending on the pressure drop. Assuming 100 per cent flash, we could arrive at a capacity 9 per cent too high or 65 per cent too low.

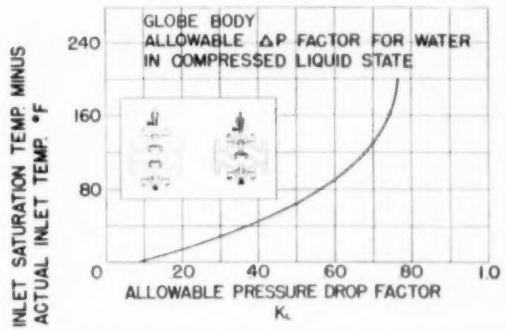

Fig. 1—Allowable pressure drop factor curve for globe bodies.

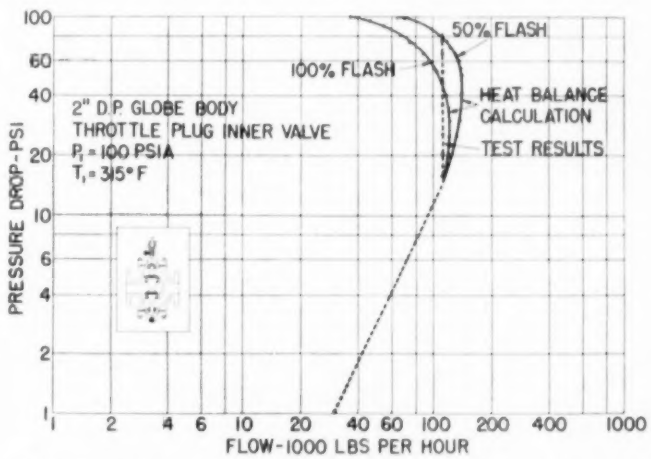

Fig. 2—Comparison of "heat balance" method calculation results and actual capacity tests.

*Fisher Governor Co. Presented at Symposium on Instrumentation, A. & M. College of Texas, 1935.

On these pages are five examples of the variety of heavy-metal equipment designed and built by Alco to solve scores of new industrial problems. Each was made possible by two important factors.

First: Alco is thoroughly familiar with industry's needs. Its designers and engineers have worked closely for many years with power, petroleum, chemical and manufacturing companies in all parts of the world.

Second: Alco has the complete production and testing facilities required to handle efficiently and economically nearly every type of metal fabricating operation.

Remember these factors next time you have a problem that calls for something extra in heavy-metal equipment. Then contact your nearest Alco Products Sales Engineer at New York, Chicago, Los Angeles, Kansas City, Houston, Tulsa or Beaumont; or write direct to Dunkirk, N. Y.

How ALCO designs

Answers to

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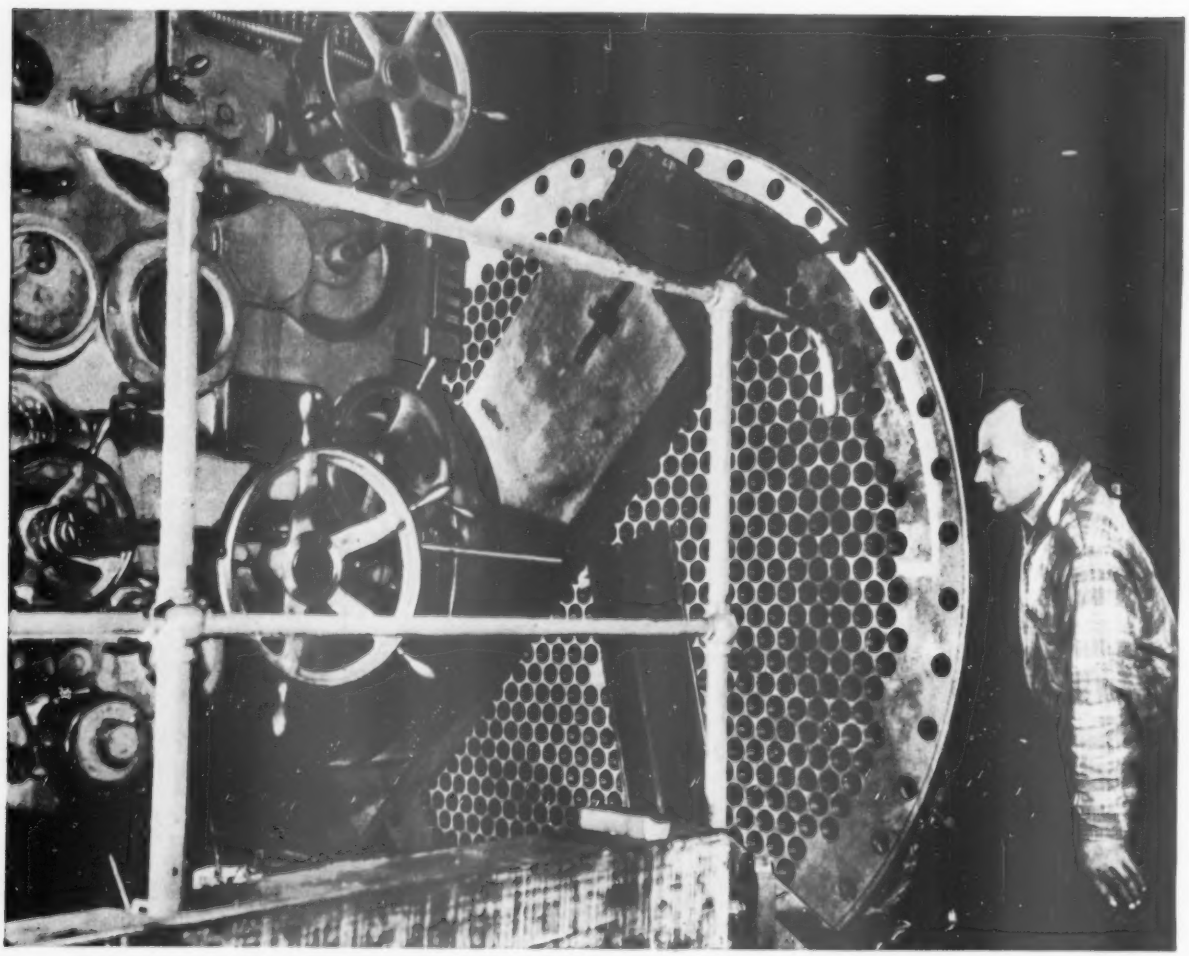
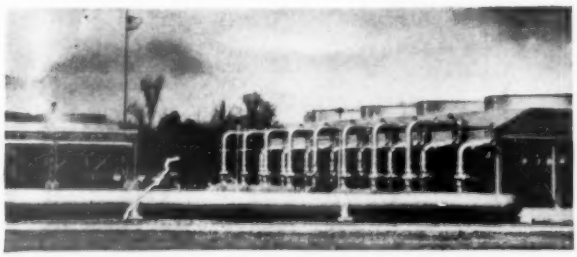
COMPLETE PRODUCTION FACILITIES, backed by years of experience, enable Alco to fabricate all types of heavy-duty power and processing equipment to meet virtually any specifications. Shown here is a specially designed flange-facing machine in operation at Alco's 31-acre Dunkirk plant.



and builds...

New Industrial Problems



ALCO AIRCOOLERS—the economical answer to a wide range of cooling problems—handle a major part of the heat dissipation at Transcontinental Gas Pipeline Company's modern compressor station at Spartansburg, S. C. Transco also installed these versatile Alco units at their stations near Comer, Ga., and Reidsville, N.C.

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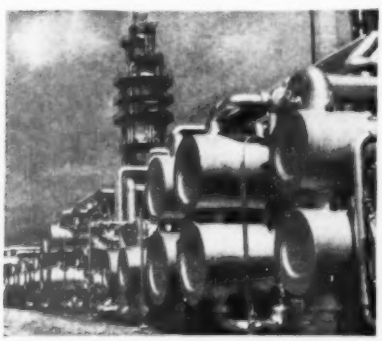
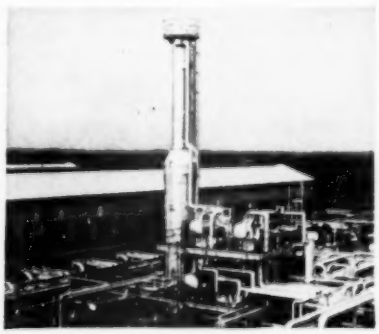
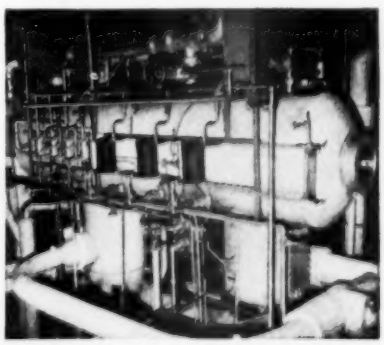


CUSTOM-BUILT HEAT EXCHANGERS were among the variety of Alco equipment specified for Esso Petroleum Company Limited's giant new refinery at Fawley, England. The largest refinery in Europe, Fawley produces fuels, solvents, lubricating oils and other products at the rate of over 6,000,000 tons a year.



DE-ETHANIZER TOWER was built by Alco to meet the strict requirements of Tennessee Gas Transmission Company's new gas processing plant at Gabe, Kentucky. Years of experience and the most modern manufacturing facilities enable Alco to produce heavy-metal equipment for nearly every purpose.



FLEX-TUBE EVAPORATORS at Florida Power Corporation's Bayboro plant at St. Petersburg, Florida, produce 7000 pounds per hour of vapor with a guaranteed purity of 0.9 ppm, based on 2480 ppm shell concentrate. Removal of scale on tube surfaces is greatly facilitated by Alco's patented Flex-Tube construction.

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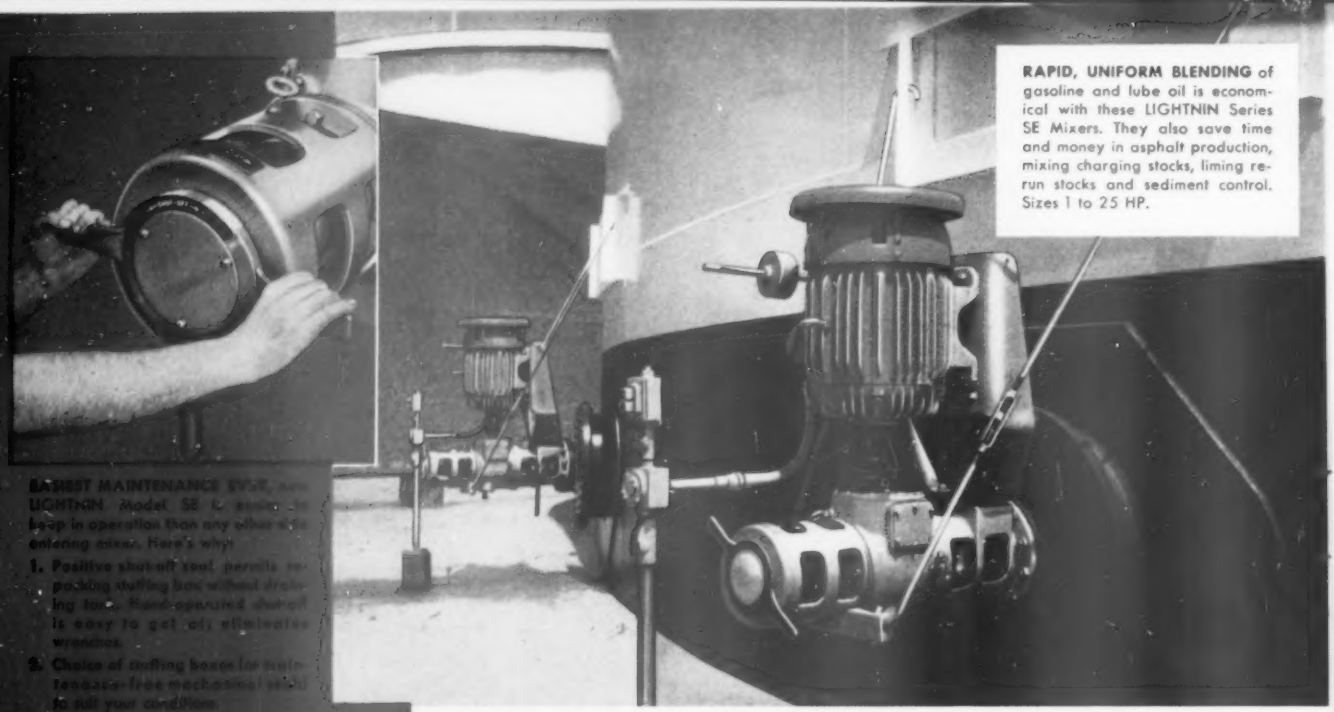

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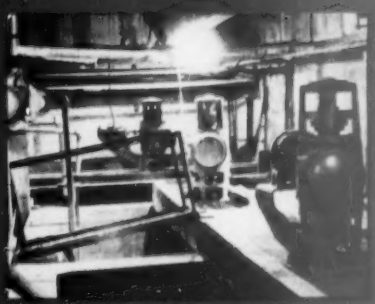

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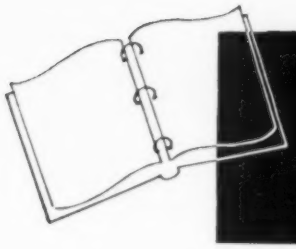

REFINER'S NOTEBOOK

by I. E. Boberg*
and
W. R. Fickett*

Alternate Types of Vessel Construction—A Cost Comparison

THE occurrence of serious graphitization is not always predictable in advance. In many operations the financial loss which results from an enforced shutdown is so tremendous that a relatively unpredictable risk cannot be justified.

In order to shed some light on the subject of first cost, it was suggested that it would be helpful to develop comparative information on several available alternatives. The alternate types of construction were selected by the A.P.I. committee in charge of this program, and the sole purpose of this paper is to evaluate them.

Vessel Selection

Two vessels were selected for comparison—one to be field erected and one to be shop built. In order to obtain the picture over a range of temperatures, it was suggested that all comparisons be made at three temperatures, as follows: 900°, 950°, and 1,000° F.

Each vessel has also been evaluated for three types of construction, as follows:

1. Mild steel, with internal insulation, to reduce the steel temperature to not more than 650° F. The diameter of the vessels under this alternate has been increased 10 in. in order to provide the same net capacity inside the insulated surfaces.

2. Mild steel, without internal insulation, utilized at the unit stresses permissible under the A.P.I.-A.S.M.E. Code for Unfired Pressure Vessels for Petroleum Liquids and Gases for the specified metal temperatures of 900°, 950°, and 1,000° F.

3. A graphitization-resistant steel (A.S.M.E. A 301, grade B) without internal insulation, utilized at the unit stresses permissible at metal temperatures of 900°, 950°, and 1,000° F. This steel contains 1 per cent chromium and ½ per cent molybdenum.

In the selection of the mild steels for alternates (1) and (2), the lowest-cost material has been used in each case. The A.P.I.-A.S.M.E. code permits the use of A.S.T.M. A 285, grade C, at steel temperatures up to and including 900° F. Therefore, A.S.T.M. A 285 C has been used for the 650° F. temperature and also for the 900° F.

For the 950° F. and 1,000° F. steel temperatures, A 201 or A 212, in either grade A or B, could be used. The base cost of both steels is the same; but, inasmuch as there is no difference in allowable unit stresses at the temperatures being considered, A.S.T.M. A 201 has been selected because of its better weldability.

Variable Factors

Certain limitations and controversial factors require discussion:

1. The comparisons apply only to the particular vessels under consideration. Although it is believed that the examples selected are reasonably typical, it would be dangerous to extrapolate the results to other vessels which have materially thicker or thinner shells. Stress-relieving and X-ray requirements vary with shell thickness, and could materially change the picture in other thickness ranges. Insulation quantities would also vary widely with shape.

2. A.S.T.M. A 301 B is a relatively new material with which there has been very little experience in field-erected plate work. The estimates given here are believed to be reasonably accurate. However, as more experience is gained, the fabricators will learn more about the relative difficulties of handling this material.

3. At the present time, there appear to be considerable controversy and wide difference of opinion on the subject of insulation of vessels in this category. The general belief seems to be that, where an internal liner is employed in a vessel for heat-insulating purposes, the external surface of the vessel should be left bare so that any hot spots indicating failure of the internal liner may be detected immediately. Others believe that external insulation is necessary. There is also divergence of opinion concerning the amount and type of insulation. From the standpoint of adequacy for field stress-relieving, some of the fabricators will undoubtedly disagree with the amount and quality of temporary insulation often provided in those cases where permanent exterior insulation is not included.

Insulation Specifications

The committee in charge of this program specified the type and amount of insulation to be included in each case.

It was concluded that the vessels operating at steel temperatures of 900°, 950°, and 1,000° F. should be provided with 4 in. of external insulation. This insulation consists of 2 in. of magnesia and 2 in. of asbestos which has been included at an estimated cost of $4.00 per sq. ft., including the cost of weatherproofing.

The internally lined vessel, which operates at a temperature of 650° F., is to have no external insulation.

Opinion varied widely on internal insulation, depending on whether a simple type was employed or a castable type retained by a dense castable surface layer with reinforcing mesh supported by studs from the shell. There was considerable opinion in favor of the latter type, at an estimated cost of about $8.00 per sq. ft. However, the committee decided that we should also indicate the probably maximum and minimum values of $3.50 and $9.50 per sq. ft.

Where field stress relief is necessary, and where no permanent exterior insulation is included, temporary insulation is required. There is a tendency here to defeat the intended purpose by skimping too much on insulation. Our experience indicates that the 2-in. rockwool blanket, which is often used, is completely inadequate for stress relieving at 1,100° to 1,200° F. unless the vessel is exceptionally well sheltered from the wind.

*Chicago Bridge & Iron Co., Chicago, Ill.

In this 470-mile, 82,000-barrel per day line

ROSS EXCHANGERS COOL LUBE OIL IN ALL 9 NORDBERG ENGINES

On duty on a major 1000-mile pipe line, this Nordberg spark ignition gas Duafuel engine is one of nine that power the pumping of 82,000 barrels of refined products a day over a 470-mile span.

Rated 1600 hp at 460 rpm, each of these 4-cycle, variable compression Nordberg engines has been outfitted with a Ross Type CP Exchanger. Safe, dependable lube oil temperatures are thus assured.

Ruggedness, repeatedly proved, has for years made Ross Exchangers the choice for numerous types and makes of equipment: Compressors, turbines, centrifugal pumps, speed increasers, truck engines, torque converters, hydraulic machinery. Pre-engineering and standardization enable meeting a broad range of requirements . . . *promptly!*

More information is quickly available in Bulletin 2.1K1. Write.

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EQUIPMENT MEN . . . in the News

Smith to Head McCullough's Eastern Sales Division

R. W. SMITH

Appointment of Robert W. Smith as eastern division sales manager has recently been announced by O. J. McCullough, vice president, McCullough Tool Co.

Smith joined McCullough Tool in 1946 as a field operator, later transferring to the sales department. In 1950 he was appointed eastern division public-relations director, a position he has held until his new appointment as sales manager.

Smith will continue to work out of the McCullough eastern division headquarters at Houston. He will assume management of sales immediately over the McCullough 25 eastern division branches located in Texas, Arkansas, Kansas, Louisiana, Mississippi, New Mexico, and Oklahoma.

Coates Field Service Announces Staff Changes

Coates Field Service, Inc., Oklahoma City, recently announced company changes which have occurred since April of this year.

General offices have been moved from 13 N. E. Thirteenth Street, Oklahoma City, to 13 N. E. Twenty-eighth Street, and which opened for business on July 6, 1953.

An additional field office has been opened by Coates Field Service in Northfield, Minn., which is under the supervision of H. E. York, field superintendent. This office will service an additional project for Northern States Power Co., Minneapolis.

The company recently closed its field office in Storm Lake, Iowa, due to completion of the Iowa Public Service Co. project. This office was under the supervision of Gene L. Land, field superintendent, who is now handling personnel and operational matters in the general office.

A subsidiary company, Field Transportation Co., has been reorganized and is now known as Coates Transportation Service Co. with R. E. Stephens as manager. Company offices are located in Hutchinson and Wichita, Kans., and Shreveport.

An additional subsidiary company has been organized under the name of Coates Supply Service Co., with general offices in Oklahoma City and branch offices in Hutchinson and Wichita, Kans.

Dowell Names Lawrence Administrative Assistant

E. D. LAWRENCE

Eugene D. Lawrence has been promoted to administrative assistant for Dowell Incorporated. In his new assignment he will assist C. E. Mangold, assistant general manager, in expediting the handling of problems concerning the operation of Dowell's various departments in Tulsa.

Lawrence joined Dowell upon his discharge from the U. S. Navy in October 1945. His first work was with the engineering deparement, but for the past 6 years he has been a purchasing agent for the company. Lawrence was educated at Northeastern Oklahoma Junior College and California Polytechnical at San Luis Obispo, Calif.

Phillip McMorrow is transferring from the Dowell accounting department to assist Lawrence.

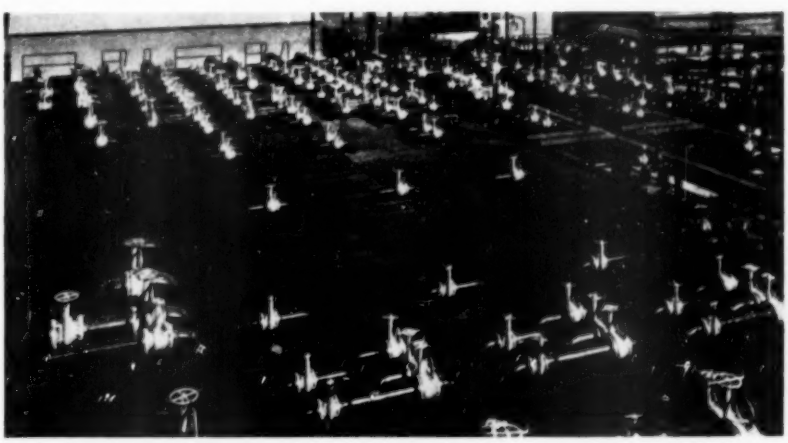
Lee C. Moore Transfers Branham to Midland, Tex.

Donald R. Branham has moved from Tulsa to Midland, Tex., where he will be assigned to the sales and service department of Lee C. Moore Corp., working out of the company's Odessa, Tex., office. Branham began service with Lee C. Moore during high-school vacations in 1948, and until recently was in the company's engineering department, Tulsa.

Union Wire Rope Adds Clinesmith to Sales Staff

Frank C. Clinesmith has joined Union Wire Rope Corp. as a salesman, with headquarters at the company's office and warehouse in Houston. Clinesmith previously spent 4½ years in the Naval service, which provided him with considerable experience in the use of wire rope and slings. He is a graduate of Kansas University.

Hamer Oil Tool Furnishes Valves for Refinery Installation



One hundred and sixty-nine Hamer rigid-type line blind valves have been installed by Union Oil Co. during recent modernization of the main pump house manifold at its Wilmington refinery. The Hamer line blinds, which insure positive, permanent shutoff of the line, eliminated the need for an equal number of gate valves in the manifold.

WeldELLS®

...have set their own standards

Many of the largest users of Welding fittings refuse to accept any other fittings than WeldELLS.

They have found that when the name, WeldELL, is stamped into a fitting, that fitting can be accepted without question for any service for which it is designed.

They have found that WeldELLS have features that please both the men who design and the men who erect welded piping . . . features that were pioneered by Taylor Forge . . . features that are combined in no other welding fittings.

They have found the answer to their every need in the greater range of sizes, weights and types of the WeldELL line . . . in the broader scope of materials.

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DIGEST OF NEW EQUIPMENT

IT'S NEW — CHECK IT

TRADE LITERATURE

1 BAKER DIFFERENTIAL FILL-UP EQUIPMENT. Photographs, sectional, engineering, and schematic illustrations tell how filling operation is regulated and controlled in running casing and in the introduction of back-pressure action for floating and for cementing. *Baker Oil Tools, Inc.*

2 MARVEL SYNCLINAL FILTERS. This 10-page illustrated brochure shows applications and engineering data on filters for hydraulic oils, coolants, and lubricants. Sump-type and line-type dimensional charts are provided, along with illustrations of actual mesh sizes. *Marvel Engineering Co.*

3 SPECIALIZED EQUIPMENT FOR CHEMICAL, PETROLEUM, GAS AND POWER INDUSTRIES. Catalog i.19.092B illustrates and describes cooling towers; heat-exchanger equipment; gas and air treating equipment; design, engineering, construction, and processing services. *J. F. Pritchard & Co.*

4 SWIVEL FRAME ACTION FOR TRUCKS, a four-page data sheet and article reprint, points out the advantages in using a swivel frame on trucks being used in off-highway applications. With the swivel frame principle the cab operates independently of the truck body giving flexible chassis action over rough ground. *Willock Truck Equipment Co., Ltd.*

5 PNEUMATIC CONTROL ACCESSORIES. New 16-page Catalog 8950 describes, illustrates, and provides specifications for a wide variety of accessories for pneumatic control applications. Included are air pressure regulators, air filters, pneumatic switches, valve positioners, and other highly functional equipment. Data on control piping systems and the computing of air capacities are also included. *Minneapolis-Honeywell Regulator Co.*

6 MECHANICAL AND HYDRAULIC JACKS, HYDRAULIC PULLERS AND SPECIAL-PURPOSE JACKS. The catalog is letter-sized and contains 34 pages of application pictures and information, detail drawings, specifications, plus a full listing and illustration of all accessories and attachments that are available. A handy index is provided to save reference time. *Templeton, Kenly & Co.*

7 IDEAL TYPE E HOOK BLOCKS. Features of operation and design are described and illustrated by half-sectional views of operating parts in Bulletin 390. Specifications are given for five hook blocks rated at 90, 140, and 200 tons and ranging in over-all length from 82¼ to 119½ in. *The National Supply Co.*

8 MARLOW OIL-COUNTRY PUMP, a new 20-page brochure, describes oil-country pumps and the part they play in locating, producing, transferring, and refining oil. Following a brief review of the birth and development of the oil industry, the bulletin illustrates a wide range of pumps with on-the-job scenes covering various types of installation. Design and performance features are discussed for various models illustrated. *Marlow Pumps.*

9 ROTATING AIR UNIONS. Bulletin D-53 includes details on two sizes of unions for single-passage service; the story on the new Dueblin Deu-

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Corresponding to new equipment items or trade literature abstracts in the Oil and Gas Equipment Digest of The Oil and Gas Journal, Aug. 3, 1953

PLEASE PRINT
COMPANY NAME .....
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NAME ..... TITLE .....

Plex union for double-passage applications, and facts on the new chatterproof quick-release valve. *Deublin Co.*

10 10 REASONS WHY YOUR NEXT ENGINE SHOULD BE A MURPHY, a new 48-page booklet, gives detailed descriptions of engineering design features to look for in diesel engines. In addition, ratings and descriptions of diesel models are presented, including 19 pages of photographs of typical installation. *Murphy Diesel Co.*

11 RIG ON THE MOVE. This four-page booklet describes the role of crawler tractors and motor graders in the task of moving drilling rigs to and away from drilling sites. Booklet is illustrated with pictures of bulldozer-equipped diesel tractors moving portable rigs, filling slush pits, and preparing drilling-site areas. *Caterpillar Tractor Co.*

12 STATUS OF HILLER HELICOPTERS. This information sheet illustrates and describes three types of helicopters now in production, including Hiller 12-B adaptable for use in business and industry; facts about product development; research and development, with complete specifications and performance chart. *Hiller Helicopters.*

13 NEW CATALOG SHEET on all-manganese steel back-hoe buckets outlines features of the buckets, and includes photographs taken from every angle as well as drawings of the types of side cutters available. *American Manganese Steel Div.*

14 SK GEAR PUMPS. This 24-page, 2-color bulletin describes all standard pumps, illustrates and briefly describes some of the special types engineered to meet unusual requirements. It discusses pump design, construction, and operation, and how they are used in petroleum, petrochemical, and power fields. Bulletin includes cutaway and dimension drawings, photographs of pumps in action, tables of capacities, pressures, dimensions, and operational data. *Schutte & Koerting Co.*

15 WATER-TUBE STEAM GENERATORS. Data and specifications for completely factory assembled units in nine sizes, ranging from 5,300 to 33,000 lb. of steam per hour; for pressures up to 400 psi. designed to provide fully automatic firing with oil, gas, or stoker-fired coal, are described in a new eight-page illustrated catalog. *Superior Combustion Industries, Inc.*

16 COMBUSTION GAS TURBINES FOR MECHANICAL DRIVES is a 24-page booklet on combustion-gas-turbine power plants for mechanical-drive applications. Combustion-gas turbines can mean savings in installation operation and maintenance costs for natural-gas transmission, in chemical and refinery plants, and in other process industries. Booklet describes 1,800-hp., simple open-cycle; 5,000-hp., compound open-cycle with regenerator; 5,300-hp., compound open-cycle; and 7,000-hp., simple open-cycle. *Westinghouse Electric Corp.*

17 NEW OIL-INDUSTRY HOSE BULLETIN is a new, fully illustrated eight-page booklet describing types of hose produced for the oil industry by this firm. Some of the hoses described are barge loading, oil suction and discharge (both smooth bore and rough bore), butane-propane, fuel oil, gasoline pump, tank truck, tank car, and many others. *Quaker Rubber Corp., Division of H. K. Porter Co., Inc.*

18 SJR SHORTSTIR SIDE ENTERING MIXERS. The new manual shows photographically the step-by-step procedure to be followed in servicing new mechanical seal and self-lubricating shaft bushing recently developed by the firm. New seal and shaft bushing, designed for easy field adaption on existing mixers, was developed with the help of refinery and pipe-line operators. *Sawyer-Jensen-Ross Co.*

19 METAL BUILDINGS. A new four-page pictorial descriptive folder gives specifications, general advantages, and structural information regarding a new type of self-supporting, metal, prefabricated building which is trussless. Typical construction samples in photography are included. *The Aber Co., Inc.*

FOR MORE INFORMATION . . . . use one of these cards

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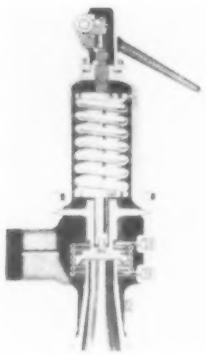
DIGEST OF NEW EQUIPMENT

IT'S NEW ✓ CHECK IT

by Dan B. Miller



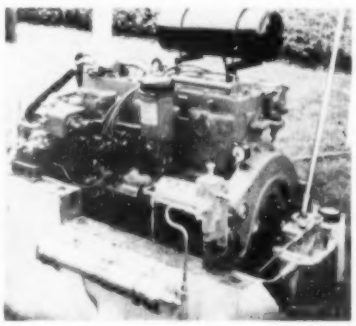
20 INTERNAL HEAT EXCHANGER. An exclusive feature, available in all Farris nozzle and seminozzle safety-relief valves, is an internal heat exchanger. This unit can be incorporated in the valve body without creating interference with the rest of the valve mechanism. The interval heat exchanger eliminates the necessity of steam tracing or steam jacketing a valve where highly viscous lading is encountered. The Farris heat exchanger keeps the lading material in a fluid state with exceptionally low steam consumption. It provides maximum efficiency by placing the heat where it is most effective. It consists of a steel coil inserted into the valve body and led out to connect with a steam line. The coil ends are accessible for return-pipe installation or one-pipe installation with a vent valve. A steam trap drains the coils and the construction is suitable for back pressure. *Farris Engineering Corp.*

IT'S NEW ✓ CHECK IT

21 TUBING GRIPPER. This handy new tool enables the crew to handle tubing safely and easily. You can push or pull after applying gripper to the tubing collar. Made of special aluminum alloy the tubing gripper weighs less than 2 lb. The inner prong is covered with rubber which affords protection for internal threads. *Baird Manufacturing Co.*

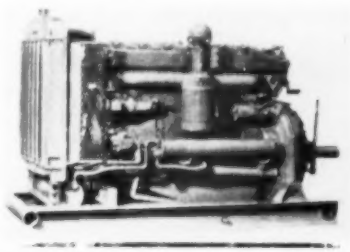
IT'S NEW ✓ CHECK IT

22 HYDROTOR HYDRAULIC CRANKING MOTOR is designed for quick starting of heavy-duty engines, eliminates the use of storage batteries and electric or pneumatic starters for cranking these engines. Hydrotor has a record of developing quick starting on heavy-duty engines at both subzero and at extremely high temperatures. Hydrotors come in three sizes to fit and crank most internal-combustion engines, diesel, or gas. Advantages claimed for Hydrotor are: Efficient, independent cranking at all temperatures in all climates. It has been tested successfully at minus 65° to plus 150° F. The Hydrotor, being nonelectric and of aluminum construction, is completely explosion-proof. Hydrotor will operate over a range of speeds and slow enough to adjust timing or free engine to maximum rating. For installations requiring frequent starting, a small displacement engine-driven pump and unloading valve are furnished to automatically recharge the hydraulic accumulator during engine operation. Energy can be readily restored to the accumulator by a few strokes of the hand pump. *Hydramotive, Inc.*



IT'S NEW ✓ CHECK IT

23 MURPHY DIESEL. The power range of Murphy diesel engines has been extended upward with the addition of four new models having a bore of 6⅜ in. and a stroke of 6½ in. The new Model 24 is rated at 185 hp. continuous, 200 hp. intermittent; the Model 124 at 210 hp. continuous, 225 hp. intermittent; the Model 224 at 200 hp. continuous, 215 hp. intermittent; the Model 324 at 225 hp., continuous, 240 hp., intermittent. Models 24 and 124 are designed to operate at 1,200 r.p.m. continuously; Models 224 and 324 at 1,400 r.p.m. continuously. The addition



KEEP INFORMED ✓SAVE TIME ✓TEAR OUT CARD ✓CHECK IT ✓MAIL IT

This Digest of New Equipment offers you a quick resume of important features of new or improved products and trade literature and the opportunity to obtain complete information on each subject by use of the convenient "CHECK IT - MAIL IT" service card.

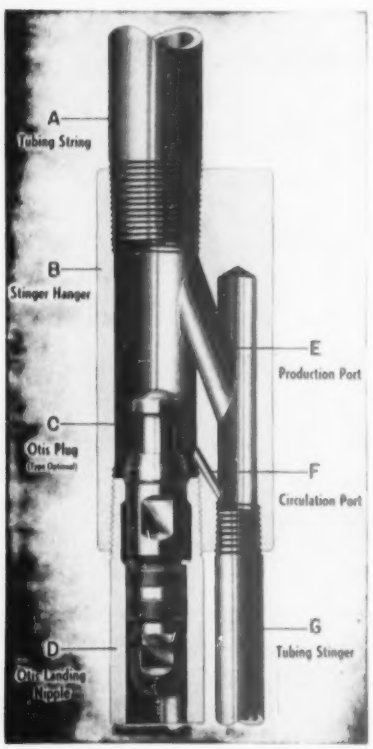
of these four models brings to 25 the number offered. They range in output from 90 to 240 hp. *Murphy Diesel Co.*

IT'S NEW CHECK IT

24 NEW WELL-CHECKER UNIT FOR WATER-FLOOD PROJECTS. The new Unit No. IH-3006 was especially designed for testing in water-flood projects, and in fields where little or no gas is produced. Free water knockout units are available in a number of different sizes. Unit No. IH-3006, shown here is recommended for 900 bbl. liquid per day, with 10-minute retention time. It has a special built-in gas eliminator. Water is removed from the bottom of the unit, oil is removed from the top, and all gas is taken off at the same time through the special built-in gas eliminator. *Rolo Manufacturing Co.*

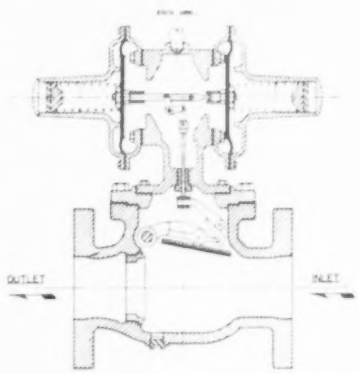
IT'S NEW CHECK IT

25 NEW DALE STINGER HANGER will produce a well from either the top or the bottom of the producing zone. In gas-injection wells the gas can be injected either to the top or the bottom of the zone and the well can be reverse flowed through the stinger. Pressure, temperature, and spinner instruments can be run into the producing interval, even though the well is normally produced from the bottom. The tool consists of a stinger hanger on the regular string of tubing with an Otis landing nipple and plug, and a 1 or 1½-in. stinger extending down through the producing interval. *Dale Co.*



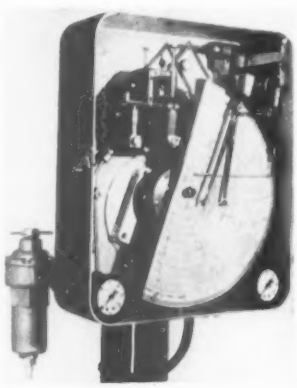
IT'S NEW CHECK IT

26 AUTOMATIC SHUTOFF VALVES will provide automatic shutoff in the event of either increase or decrease in pressure. Installation may be upstream or downstream (in relation to the regulator), with or without static line control, for either high or low-pressure application. These automatic shutoff valves have a broad application in the oil, gas, and chemical process industries. The Thru-Flow design provides for installation valve in existing pipe lines with negligible pressure drop. The Model "IDPS-L" (closes on increase or decrease of pressure, static line control, low pressure application) is illustrated. They are available in either cast iron or steel, as may be required. *Security Valve Corp.*



IT'S NEW CHECK IT

27 NEW DIFFERENTIAL CONTROLLER. A newly developed differential controller for changeover valves has been designed for orifice-meter measuring stations where a wide variation of flow conditions is encountered. It offers an easy, positive, and economical means of automatically turning an additional measuring unit into the line when needed and shutting it off completely when not needed. The object of the procedure is to obtain accurate measurement where there is considerable variation in flow. When the differential across the primary orifice reaches a predetermined maximum setting the controller actuates the four-way valve. This valve admits the supply from the regulator to the cylinder opening the Nordstrom valve. This puts the secondary meter into service in addition to the primary meter. When the load drops and the differential of the two meters in operation falls below the preset minimum, the four-way valve is repositioned by the controller. This admits pressure to the cylinder. The pressure closes the Nordstrom valve and shuts off the secondary meter. The differential control unit is mounted in the orifice meter case, offering a compact unit of rugged construction and assured accuracy. The orifice meter which actuates the differential control mechanism also serves as the primary measuring unit. *Rockwell Manufacturing Co.*



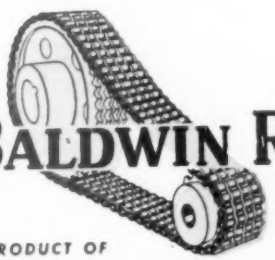
IT'S NEW CHECK IT

28 NEW ½-IN. SQUARE DRIVE ELECTRIC IMPACT WRENCH. This tool can be used with a variety of sockets and attachments and will greatly increase

can you use this new Roller Chain?

Maybe you can use the Improved Baldwin Assembly Multiple Width Riveted Roller Chain... IF you want to save money...save costly down time...speed up chain assembly and repair in the supply store and in the field...simplify chain inventory and stocking!
It's not particularly sensational...just the handiest, most usable riveted roller chain yet! Here's all there is to it. It's just a ten-foot strand riveted multiple width chain with exclusive Single Pin Couplers installed at convenient intervals in the strand, so that any length of chain may be made up in a hurry without cutting the chain or damaging chain parts. It's just as easy to couple and uncouple as cottered chain. BUT the entire strand retains the added life of riveted chains. You can install these chains in a hurry and save plenty by cutting "down time." Chain is shipped in boxes with a ten-foot assembled length in each box. Or, it can be *made up* in any length you specify. Why not send for the complete story? Just mail the coupon.

HERE IT IS: One end of the single pin coupler link is firmly riveted to the adjacent link (1). The unique coupler pin (2) has a spun washer (3) on one end, the other has a milled flat (4) and locking pin. The pin is an easy fit through the chain except for the milled flat end which is press-fitted into a special matching hole (5) of the single pin coupler plate. You need only drive the pin the length of its milled flat in assembling or disassembling the chain. It's easy . . . saves time, effort and money.



BALDWIN REX ROLLER CHAINS

A PRODUCT OF

Chain Belt COMPANY *OF MILWAUKEE*

Baldwin Rex Oil Field Sales Offices:

New York • Tulsa • Dallas • Houston • Midland • Los Angeles

53-405X

CHAIN BELT COMPANY
Baldwin-Duckworth Division
357 Plainfield Street
Springfield 2, Mass.

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Please send my copy of Bulletin No. 52-2

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City.....*Zone*.....*State*.....

the working speed of any maintenance man. With it, series of nuts can be removed or installed in a fraction of the time needed for standard hand tools. It can also be used for driving gear pullers, stud removers, all type of screwdriver bits, hole saws, structural reamers, and steel, wood, or mortar bits.

After a certain torque is reached, the rotary action of the heavy-duty motor is transferred through the impact mechanism to sharp, powerful blows at the drive spindle. The blows become heavier as the torque increases, thus, the larger the nut, the heavier turning impact it receives. It delivers up to 2,000 of these powerful rotary blows per minute, and as there is no direct connection, the motor runs continuously. It cannot be stalled or burned out because of overload. None of the torque is transmitted to the operator, allowing easy one-hand operation under all working conditions. Forward or reverse action with or without the motor running is obtained by twisting the end cap. *Snap-On Tools Corp.*

IT'S NEW CHECK IT

29 ALUMINUM "HARD BOILED" CAP. Although classed as a cap, Shorty offers the protection of a safety hat; meets industry and federal specifications of 40 lb. impact resistance, and is light in weight. The Shorty model weighs only 10 oz. It is drawn from aircraft-grade aluminum, and has the ribbed crown design that adds extra protection without sacrificing resiliency. Shorty has a visor that protects the front of the face. The flared brim edge is wide enough to keep the ears and neck safe. This model is ideal protection for workers who must crawl in and out of close quarters or who must carry loads on their shoulders. Satin-finish aluminum will not reflect light and cause blind spots in the eyes of other workers. The finish is permanent and will become neither duller nor brighter with use. Shorty model has the universal-head-size feature; one size fits all heads with the fully adjustable head-band assemblies. *E. D. Bullard Co.*

IT'S NEW CHECK IT

30 HILLER HELICOPTERS. For fast deliveries, inspection, or supervision in inaccessible areas, the Hiller Helicopter offers the petroleum industry the most practical means of transportation. Requiring a minimum space for landings and takeoffs, these craft can place personnel or equipment within a few steps of any field installation. With top speed up to 84 m.p.h., and a cruising speed up to 70 m.p.h., the Hiller Helicopter provides fast and efficient means of transportation. This equipment is rugged and especially stable, providing for safe flight under rough operating conditions. Wide, roomy cabin provides comfort for both pilot and passengers with ample seat, shoulder, and leg room. Extensive distributorship system provides for world-wide service. *Hiller Helicopters.*

IT'S NEW CHECK IT

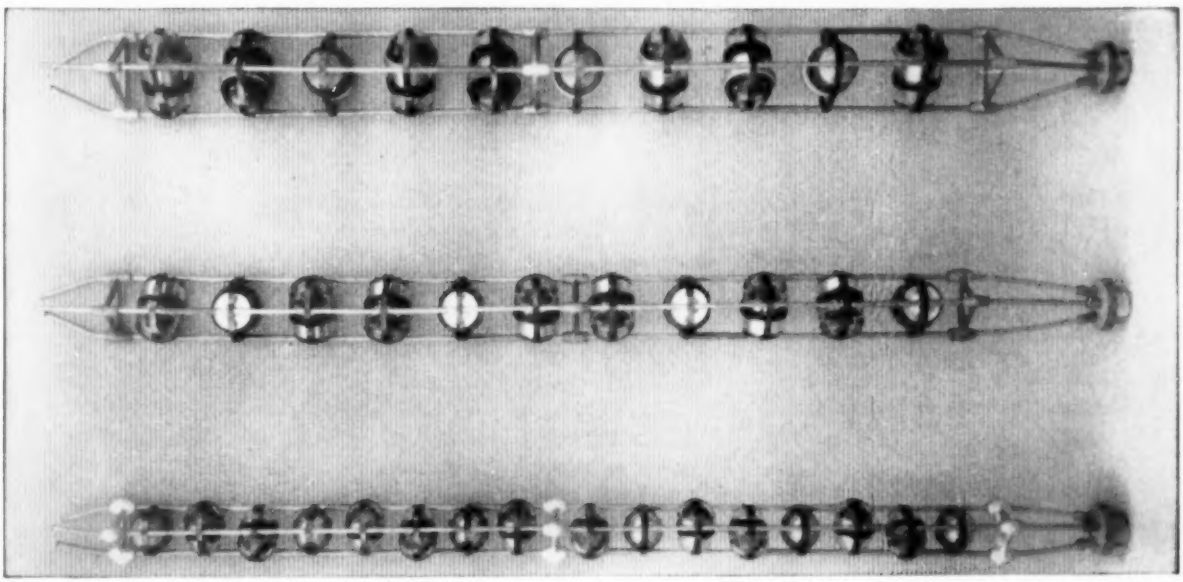
31 ROTARY KNIFE-MOWER DRIVE POWERS NEW CHAIN SAW, CIRCULAR SAW. The chain saw can be quickly attached to the drive. The chain saw can be clamped in any position, and moved to any angle. It is furnished with a standard 26-in. chain and blade, but optional lengths are 20, 32, 36, and 40 in. Most sawing work can be done in a comfortable standing position, and it can notch and fell timber close to the ground. The same feature applies to the 18-in. circular saw. It also is attached to the same drive, is useful for clearing small timber and sprouts, cutting them off at ground level. The new combination attachments make a total of 21 attachments that are powered by the Gravely tractor. *Gravely Tractors, Inc.*

IT'S NEW CHECK IT

32 AIR-FLOW SHOCK ABSORBER installed on a pumping well will eliminate rod parting, will save expensive gear-box maintenance, and many hours of down time and lost production. Pumps can be run more strokes without strain on rod line or machine. The shock absorber provides cushioning to the action of the pumping well, and its advantages lie largely in lower maintenance costs. Only wearing part on the shock absorber are replacement rubbers. *Airflow Shock Absorber Co.*

DOWELL GLASS GUN PERFORATING SUCCEEDED WHERE OTHER METHODS FAILED

Gas Well Production Increased from Show To 3½ Million Cubic Feet Per Day— Exceeding Requirements for Gas Drive Project



Dowell Glass Guns can be assembled to fit practically any well diameter that may be encountered. Three different sizes of charges permit gun construction as small as 3⅜ inches and up to 3 feet or more in diameter. Special "angle" guns shoot 30 degrees off the horizontal to penetrate shale streaks and give better formation drainage.

Here is an example of the effectiveness of Dowell's Glass Gun . . . producing results after regular bullet and steel gun jets had failed.

This well was completed as an oil well but was found to be non-profitable. It was then plugged back to a known gas zone. Several unsuccessful attempts were made to recomplete the well by perforating the 23-lb. 7-inch OD casing and the cement. Both bullets and steel gun jets, at 6 shots per foot, gave only a show of gas.

Dowell was then called to perforate with the Glass Gun. After 70 GG7 shots, at only 2½ shots per foot, the well was producing at a rate of 3½ million cubic feet per day. The remainder of the job was called off because the gas drive project required only 2 million cubic feet of gas per day.

In addition to greater penetration, Glass Guns give larger perforation hole size. They are also of value in open hole shooting because they are self-destroying, and leave a junk-free hole.

Glass Guns are run on Dowell Electric Pilot equipment engineered for accurate sub-surface measuring.

If you would like to know more about this exclusive, horizontal-firing Glass Gun, the Angle-Jet Gun, the Mono-Directional Glass Gun, or any other Dowell oil field services, make it a point to contact your nearest Dowell office. Or write directly to Tulsa, Dept. H-11.

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LOCK ON

VETCO

OFF-N-ON

DRILL PIPE AND CASING PROTECTOR

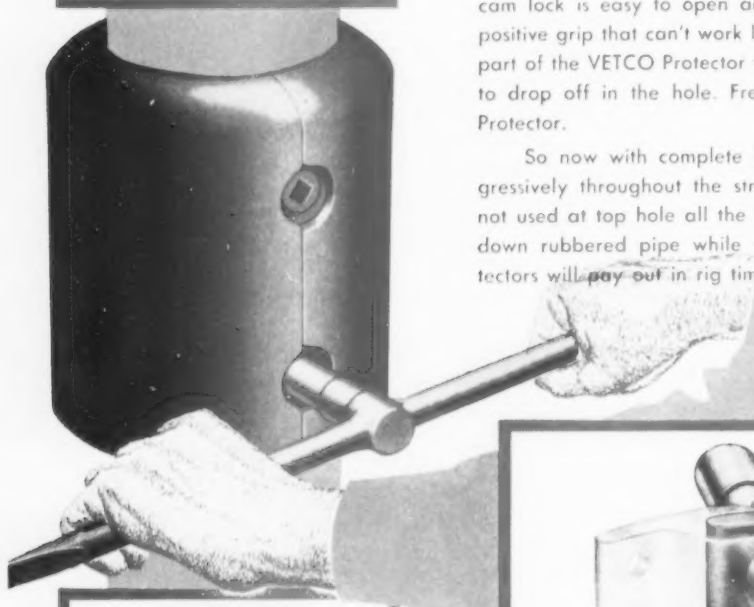
The VETCO is installed on the pipe. Cam locks are engaged easily by hand. And then are locked tightly by means of a "T" handle wrench which is the only tool needed.

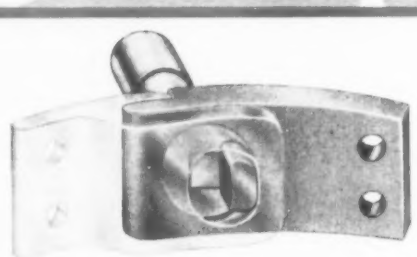
pays for itself in rig time saved...

VETCO Protectors go on and come off fast—8 to 10 seconds. With one quick motion you lock VETCO Protectors on the joint you want. You get complete flexibility and complete control with rubbers on only the joints you want. Your own crew puts Protectors on and off without waiting for a service crew.

The cam locks the Protector on with a tight grip that won't jar loose, can't slip, and won't move in any way. This cam lock is easy to open and to close; yet it closes with a positive grip that can't work loose. The cam lock is an integral part of the VETCO Protector with nothing to misplace, nothing to drop off in the hole. Frequent changes do not hurt the Protector.

So now with complete freedom you can use pipe progressively throughout the string. The same rubbered pipe is not used at top hole all the time. You no longer need to lay down rubbered pipe while tripping. VETCO Off-N-On Protectors will pay out in rig time saved.





The forged cam lock is built right into the VETCO Protector. Nothing to come loose and fall in the hole. Nothing can loosen the tight lock.

The alloy steel bands form a strong skeleton to grip the pipe. Rubber is compressed between the metal bands and the pipe for a tight grip which prevents movement of the protector.

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NATURAL GAS

Ohio Fuel Says Midwest Needs More Natural Gas

COLUMBUS.—The rapid expansion by transmission firms in the past few years is just beginning to satisfy the tremendous demand for natural gas, according to a recent report by Ohio Fuel Gas Co.

The report, entitled "A Report on Why Gas for House Heating is Restricted at Present," points out the company gets 90 per cent of its gas from outside the state, principally from the Southwest. However, the company states additional supply is needed but cannot be obtained now.

Ohio Fuel reports it has over 70,000 waiting for gas heat approvals. Under those circumstances the company, in order to protect service to its present customers, asked the Ohio Public Utilities Commission for an order restricting additional approvals of gas furnaces. This was granted recently bringing about few approvals this year.

However, the company reports it is not alone in running into obstacles in meeting completely this large demand for more gas. It says in Chicago there are 135,000 customers with applications on file for gas heat. In Detroit, and 90 other Michigan communities, there have been no approvals for conversions since May 22, 1950. Also, in the northern Illinois area around Chicago, there are 80,000 reported on the waiting list.

The concern says that in the past 6 years it has spent more than $100,000,000 for new pipe lines and other facilities to deliver more gas. In that time, the company has almost doubled the volume of gas delivered, extended gas service to 94,000 more customers, and provided gas heat for 331,000 homes.

March Gas Production Tops February by 28,300 M.M.c.f.

AUSTIN.—A total of 453,912,332 M.c.f. of gas was produced in Texas during March, an increase of 28,357,909 M.c.f. over February's production, according to the Texas Railroad Commission.

Slightly over half of the increased production went to transmission lines which took 278,308,388 M.c.f., or 65.40 per cent of the total gas produced in March. Of this amount 190,368,931 M.c.f. was exported from the state, compared to 176,562,177 M.c.f. exported in February, accounting for virtually all of the transmission increase.

Next largest increase was registered by the amount of gas cycled, which was 41,116,409 M.c.f. compared to February's total of 35,259,630. On the other hand, wanted gas totaled 27,582,047 M.c.f., a decrease over the previous month of 1,213,182 M.c.f. However, increases were denoted in the following totals: extraction loss-plants, 15,181,900 M.c.f.; plant fuel and lease use, 34,539,875 M.c.f.; pressure maintenance and repressuring, 23,882,408 M.c.f.; carbon black, 18,221,507 M.c.f.; and plant-water difference, 160,618 M.c.f.

First Quarter Production Up Only 3.5 Per Cent

WASHINGTON. — Marketed production of natural gas for the first quarter of this year was only 3.5 per cent larger than in the first quarter of 1952, compared with a gain of 13 per cent for 1952 over 1951.

The Petroleum and Natural Gas Branch of the Bureau of Mines reported marketed production of natural gas in the first quarter at 2,226,500 M.M.c.f. compared wth the unrevised total of 2,152,000 M.M.c.f. for the first quarter of 1952.

The bureau's figures indicate that there were three important factors contributing to the smaller increase this year.

First, more of the winter demand was supplied from underground storage than in past years. Withdrawals from storage amounted to 108,300 M.M.c.f. for the first 3 months of 1953 compared with 95,400 M.M.c.f. for the same months of 1952.

Next, industrial consumption of natural gas increased less this year than last. Reported consumption for the first quarter of 1953 represented a gain of 2.6 per cent compared with a gain of 19.9 per cent in 1952. Also, use of natural gas in the production of carbon black is decreasing in actual volume. This use of gas accounted for 78,800 M.M.c.f. in the first quarter of this year, down 20,800 M.M.c.f. or 21 per cent from the same quarter in 1952.

NATURAL GASOLINE

N.G.A.A. School Graduates 21 at Final Session

NORMAN, Okla.—The Fractional Analysis School graduated 21 students at its last session here recently.

Under the sponsorship of the Natural Gasoline Association of America, the school opened last September at the University of Oklahoma. It offered short courses of 3-weeks duration in low-temperature fractional analysis. With the exception of the last class, each class averaged 10 to 12 students.

All told over 100 persons were graduated from the school. The graduates in the last class included:

J. F. Wilson, Union Oil Co. of California, Brea, Calif.; George E. McIver, Magnolia Petroleum Co., Dallas; Arthur J. Koch, Claiborne Gasoline Co., Lisbon, La.; M. F. Wirges, Cities Service Oil Co., Bartlesville, Okla.; Joe F. Wood, Skelly Oil Co., Pawhuska, Okla.; F. M. Perry and Dan Smith, Phillips Petroleum Co., Bartlesville; Robin Pate, The Chicago Corp., Carthage, Tex.; C. L. Kendrick, Gulf Oil Corp., Tulsa; M. F. Knubbe, Glove Oil & Refining Co., Lemont, Ill.; E. J. Rogers, Phillips Petroleum Co., Odessa, Tex.; Melvin Landry, Bates & Cornell, Eunice, La.; J. W. Howland, Mene Grande Oil Co., Caracas, Venezuela; T. J. Voss, Hunt Oil Co., Bernice, La.; William H. Beecroft, Chemical & Geological Laboratories, Ltd., Edmonton, Alta.; Billie Labenske, Sunray Oil Corp., Snyder, Tex.; C. J. Waters, California Research Corp., LaHabra, Calif.; Wm. C. Zeigenhain, Tide Water Associated Oil Co., Drumright, Okla.; Ira Reavis, Magnolia Petroleum Co., Premont, Tex.; C. E. Davis, Chemical & Geological Laboratories, Ltd., Casper, Wyo.; and Robert C. Patterson, Parade Co., Overton, Tex.

May Output Rose Sharply

WASHINGTON.—Production at natural-gasoline and cycling plants averaged 637,000 bbl. daily for May, according to the monthly report by the Bureau of Mines.

The May production represented an unusually large increase over the same month last year since plant operations in May 1952 were restricted by the refinery strike. Plant output in May of this year was 96,000 bbl. daily or 17.7 per cent greater than last year.

The largest increase over May 1952 was in the production of L.P.G., up 62,000 bbl. daily or 26.1 per cent.

Better Valves–Year After Year

Fig. 375 — 200-pound Bronze Gate Valve with screwed ends, union bonnet and renewable, wear-resisting "Powellium" nickel-bronze disc.

Because throughout more than a hundred years Powell Engineers have never been willing to "let well enough alone," the Powell Line of Valves has been continually improved and expanded to satisfy every new demand of industry.

That is why there is a greater variety of Powell Valves in service today than of any other make.

The Wm. Powell Company
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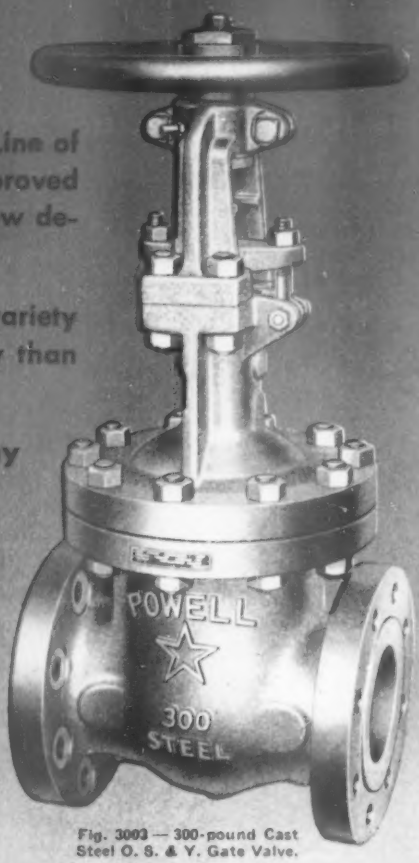


Fig. 3003 — 300-pound Cast Steel O. S. & Y. Gate Valve.

Fig. 2342—Stainless Steel Swing Check Valve for 150 pounds W.P. at 500F. Also made for 300 and 600 pounds W.P. at 800F. Available in other corrosion-resisting metals and alloys. Also furnished with screwed ends.

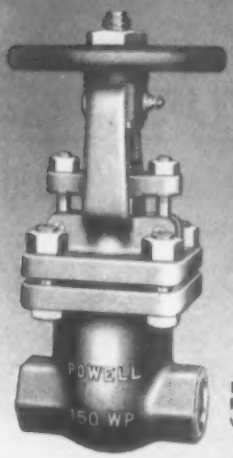
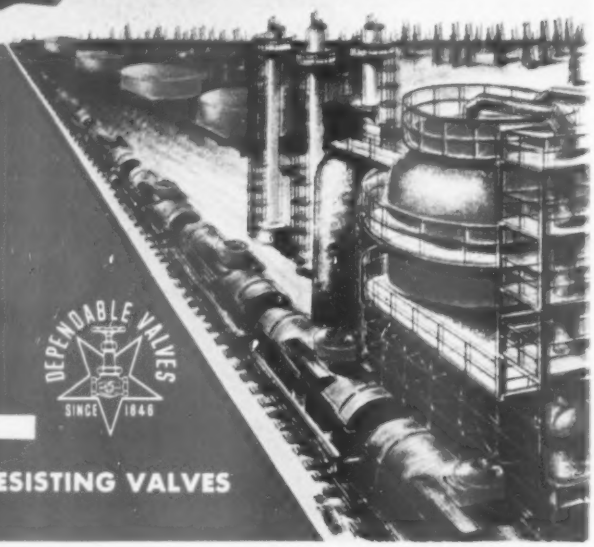


Fig. 2490 — Stainless Steel O. S. & Y. Gate Valve for 150 pounds W. P. at 500 F. Can be furnished with solid or split wedge and with flanged ends.

POWELL

DEPENDABLE VALVES SINCE 1846

BRONZE, IRON, STEEL AND CORROSION RESISTING VALVES



PIPE LINES

A.G.A. Sponsoring 600-Day Gas-Line Tests in Ohio

ATHENS, Ohio.—A 2-year series of tests on line pipe will be conducted near here by gas and steel officials starting in August or September.

The tests under the sponsorship of the American Gas Association, call for various-sized pipe to be submitted to extreme temperatures and pressures forcing them to rupture.

By measuring the speed of the cracks, experts hope to find methods to increase the safety and efficiency of pipe lines.

All told eight tests will be made at a cost of more than $100,000. The expense will be divided among the steel industry, natural-gas pipe-line industry, and natural-gas utilities companies.

The industry committee in charge of the tests is headed by C. F. de Mey, vice president and chief engineer of Columbia Gas System Service Corp. Others on the committee are B. D. Goodrich, vice president of Texas Eastern Transmission Corp., Earl Smith, chief metallurgist or Republic Steel Co., and Arthur Wilder, chief metallurgist of the National Tube Division, U. S. Steel.

Field and laboratory work will be conducted by staff members of the Battelle Memorial Institute, Columbus.

Laying of 30-in. Section Of Permian Gas Line Begins

MIDLAND. — Permian Basin Pipe Line Co. has begun work on the 30-in. section of its 280-mile natural-gas-transmission line from Spraberry Trend Area field to the vicinity of Denver City, Tex.

The 30-in. section stretches 96 miles from Spraberry station, 15 miles southeast of here to Wasson field near Denver City. There the line will tie in with lateral lines from Hobbs, N. M. The gas, totaling 225,000,000 cu. ft. daily, will then be transported through El Paso Natural Gas Co. lines to the Panhandle and enter the lines of Northern Natural Gas Co., Permian's parent company.

Prior to beginning work on the 30-in. line, crews laid a 35-mile, 24-in. line between the company's Plymouth and Spraberry compressor stations, both of which are now under construction.

Work also is under way on Pembrook station midway between the Spraberry and Plymouth units. Fluor Corp., Ltd., is contractor for the station construction.

Interstate's Modernization Project Enters Final Phase

SHREVEPORT.—Interstate Oil Pipe Line Co.'s southern division is in the last 6 months of a 3-year modernization program which includes laying of 410 miles of new lines and erection of four new pump stations at a combined cost of $21,700,000.

The program will raise the company's Shreveport-Baton Rouge crude system capacity by 102,000 bbl. to a total of 365,000 bbl. per day. The new network of lines may ultimately increase the capacity another 8,000 bbl. daily.

In addition, the streamlining has eliminated 11 old pump stations and 908 miles of old lines. New stations have been built at Bunkie and New Iberia, La., and two are under construction at Finney, near Shreveport, and at Weller in Claiborne Parish.

During the past 2½ years, the company has laid 14 miles of 8-in. pipe, 94 miles of 12-in., 111½ miles of 16-in., 22 miles of 18-in., 32 miles of 20-in., and 136½ miles of 22-in.

New Gas Lines, Station Planned by Texas Eastern

SHREVEPORT. — Texas Eastern Transmission Corp. plans to construct 17 miles of natural-gas lines and a new 4,400-hp. compressor station in Texas.

One line, 6-in. in diameter, is to carry 1,000,000 cu. ft. of gas from Englehart field, Colorado County, Texas, to the company's Provident City, Tex.,-Castor, La., line, along which the new compressor station will be built in Shelby County, Texas. A proposed 8-in. line will connect the firm's Provident City-Beaumont line with Big Hill field, Jefferson County, Texas.

The entire project will cost an estimated $1,981,900.

Pioneer To Dedicate 8-In. Products Line August 10

SALT LAKE CITY. — Dedication ceremonies for Pioneer Pipe Line Co.'s recently completed 8-in. products line from Sinclair, Wyo., to Salt Lake City will be held at the company's terminal here August 10.

The 290-mile line was built by Sin-

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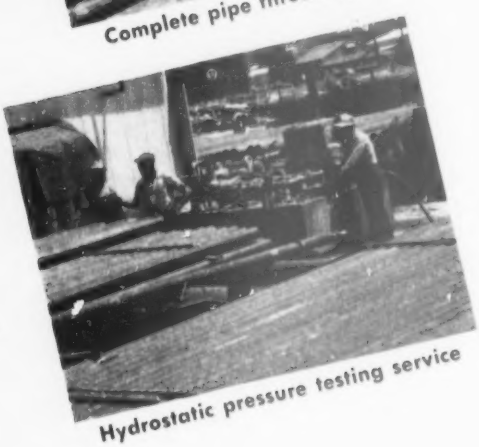

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clair Pipe Line Co., coowner of Pioneer along with Continental Oil Co., and is operated by Continental Pipe Line Co., a Conoco subsidiary. In addition to connecting this area with the Sinclair refining region, the line connects with Salt Lake Pipe Line Co.'s existing system here and products are being shipped to Burley and Boise, Idaho, and Pasco, Wash., terminal points.

Presently, the line's capacity is 12,000 bbl. daily.

Total Oil Line, Storage Construction Revealed

WASHINGTON.—A total of 9,355 miles of crude and products lines were constructed during the past 2 years ending July 1, along with completion of storage capacity for 35,365,218 bbl. in the same period, according to the Petroleum Administration for Defense.

PAD pointed out that in the 12 months ending July 1 it had authorized construction of 8,319 miles of pipe lines and 56,149,000 bbl. of storage.

PAD estimates 4,486.3 miles of pipe line and an additional 10,899,000 bbl. of storage will be constructed during the next 18 months.

The above statistics were contained in the final progress report issued by PAD's supply and transportation division. The reports have been discontinued since the Controlled Materials Plan was ended July 1.

Buckeye Purchases Ohio Crude Gathering System

NEW YORK.—Buckeye Pipe Line Co. has purchased the crude line system of Freedom-Valvoline Oil Co. in Washington, Monroe and Meigs counties, Ohio.

Freedom-Valvoline, a subsidiary of Ashland Oil & Refining Co., has operated this system for many years for the gathering of Pennsylvania Grade crude oil.

American Natural Orders Pipe for 1,200-Mile Line

HOUSTON. — The largest single order for line pipe ever received by A. O. Smith Corp. of Texas has been placed by American Natural Gas Service Corp., a holding company whose subsidiary, American Louisiana Pipe Line Co., proposes to build a 30-in. natural-gas artery from the Louisiana Gulf Coast area to Michigan.

A total of 1,200 miles of 30-in. pipe will be fabricated at Smith's plant on

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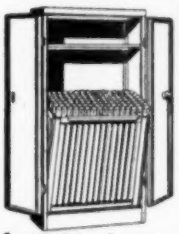

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MT4
Metal cabinet map file with locking doors. 112 tilting tubes. Easy to file and find maps, tracings to 60".
Ideal for home and field offices.
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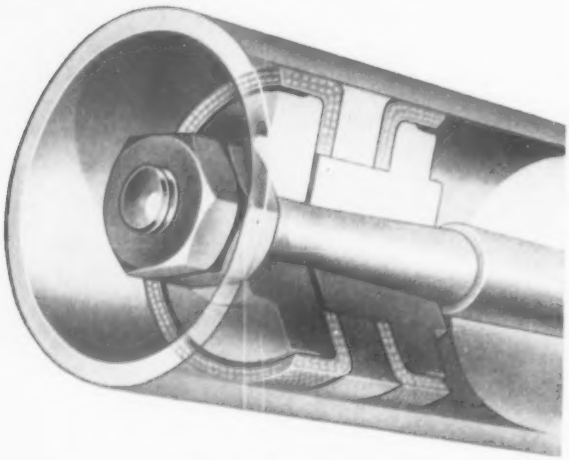
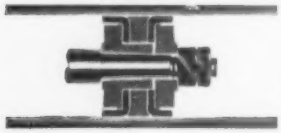
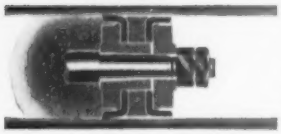


Phantom cutaway showing a typical Pumcup piston assembly.

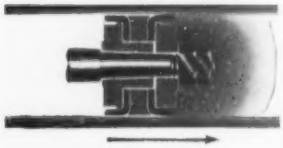
DIAGRAM OF DARCOVA PUMCUP ACTION (greatly exaggerated)



NORMAL: BOTH PUMCUPS RELAXED



UNDER PRESSURE: PUMCUPS SEAL AGAINST CYLINDER DESPITE WEAR, MINIMIZING SLIPPAGE



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2. Darcova Composition Pumcups give many times the life of other types of piston packing . . . *at least 3 to 1!*

3. Standard or special compositions are available for exceptional stability in handling almost *any* fluid . . . strong acids, alkalies, food products and even troublesome petroleum derivatives.

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THE ORIGINAL COMPOSITION CUP

PUMCUPS

the Ship Channel here. Aggregating about 313,896 tons of pipe, this order is believed to be one of the largest single orders ever placed for line pipe.

The new pipe line, yet to be approved by the Federal Power Commission in Washington, D. C., will have an ultimate capacity of about 300,000,000 cu. ft. per day *(The Oil and Gas Journal, July 27, 1953, page 211).*

Texas Pipe Line Awards River Crossing Contracts

HOUSTON.—Texas Pipe Line Co. has awarded a contract for construction of 16-in. products pipe-line crossings of the Mississippi River at Baton Rouge, La., and the Atchafalaya River near Krotz Springs, La., as part of the Evangeline Products System.

The crossing jobs were let to Panama-Williams Corp., of Houston; and J. Ray McDermott Co., Inc., Harvey, La., jointly.

Evangeline Products System pipe line, running from Port Arthur, Tex., to Baton Rouge, is owned on an undivided-interest basis by Texas Pipe Line. The line is being built for all interests, Gulf Refining Co. and Sinclair Pipe Line Co.

Signal Pushes Construction

Construction work is progressing rapidly on Signal Oil & Gas Co.'s new wet-gas gathering system in the Tioga and Beaver Lodge fields of North Dakota. The system, which will consist of pipe ranging from 3½ to 34-in. in diameter, will move gas to Signal's natural-gasoline plant now under construction near Tioga.

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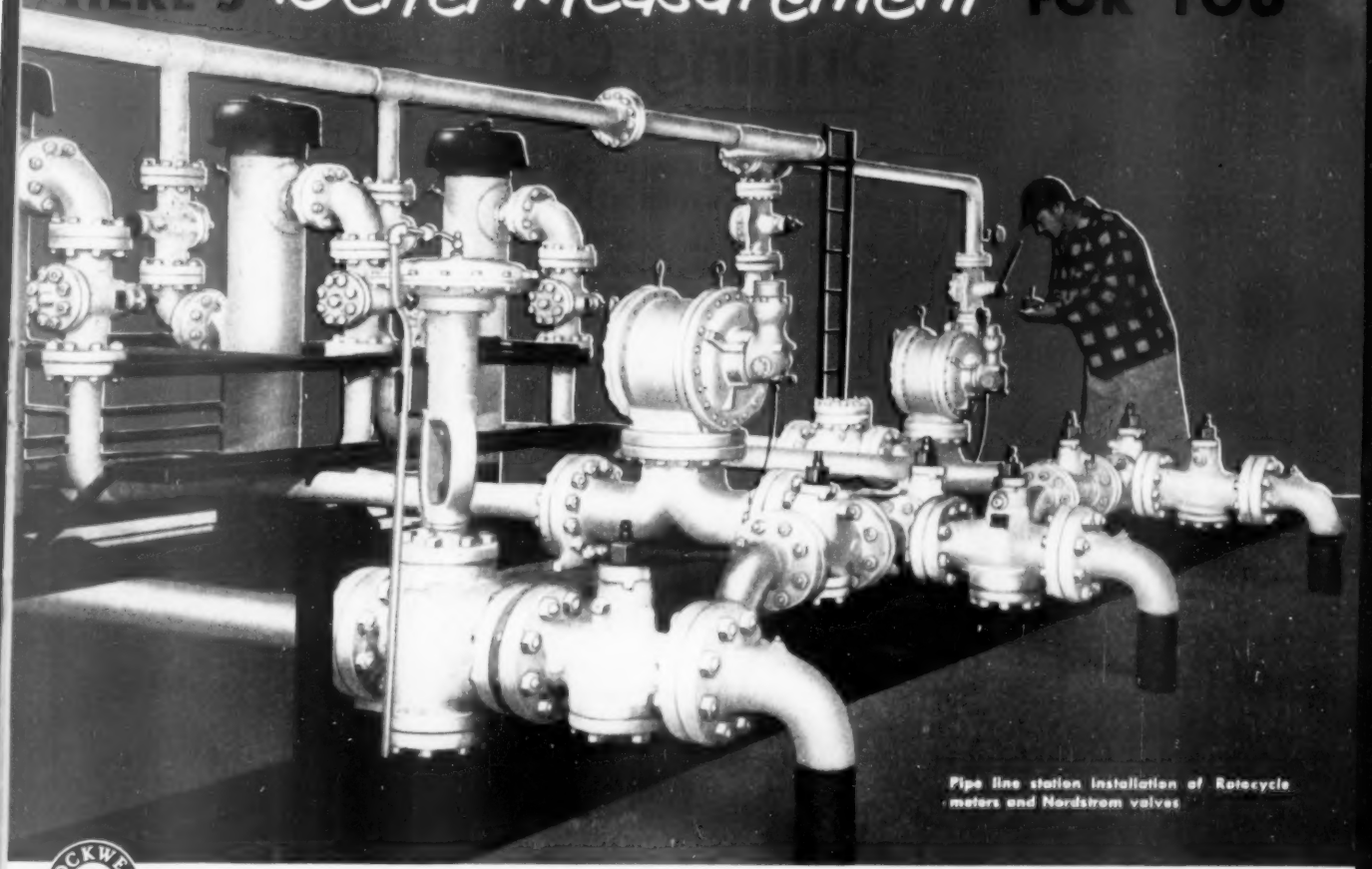

Pipe line station installation of Rotocycle meters and Nordstrom valves

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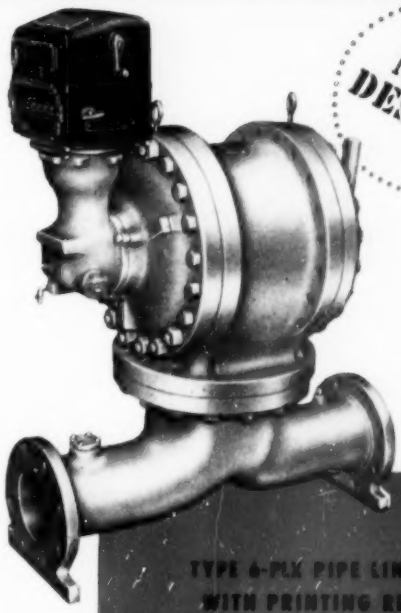

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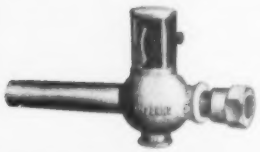

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Among the Drilling Contractors

Service Drilling Co. to Centralize Operations

Service Drilling Co., Tulsa, has announced various shifts in its personnel designed to effect greater centralization and consolidation of its operating supervision.

H. Y. Robertson, drilling superintendent, has been transferred from Sterling, Colo., to Shawnee, Okla., where he will be in charge of all drilling rigs and drilling operations in Oklahoma, Texas, Colorado, Nebraska, and Illinois.

Luther Maxwell will succeed Robertson at Sterling, where he will supervise drilling and production operations in Colorado and Nebraska.

Ralph DeLong, production superintendent, has been transferred from Stinnett, Tex., to Tulsa, where he will supervise all production operations.

Ronnie Geerdes and Kenneth Thornton will direct drilling and production operations in Texas under Robertson and DeLong. Tommy Dyer will be in charge of production operations in Oklahoma under DeLong.

E. A. Smith, Tulsa, is president of the company.

Milton Crow, Inc., Shreveport, has moved its rig from the new Paluxy sand discovery well it drilled for Tom Palmer and Phil Cochran west of the Fouke townsite, in Miller County, Arkansas, to another wildcat location northwest of McNeil field, in Columbia County, where it will drill a Pettit lime test for Ashland Oil & Refining Co. The Ashland test, 1 McClurken, in the C NE SW 6-16s-19w, is projected to 6,700 ft.

Rockdale Drilling Co. is drilling on a contract it has with Sun Oil Co. for a 6,000-ft. wildcat test, located 13 miles west of Falfurrias, in Brooks County. Location, 1 Villarreal, in the Palo Blanco Grant, Share 30, is 3½ miles northwest of Bennett field, and about 4 miles east of Palo Blanco field.

Bankhead Drilling Co., New Orleans and Baton Rouge, has taken on a contract for a 11,500-ft. wildcat test to be drilled for Shell Oil Co. at 1 Australia, in 3-8s-13e, 5 miles west of Burtville field, in West Baton Rouge Parish, coastal Louisiana.

Bateman Drilling Co., New Orleans, has a new 9,000-ft. operation under way in the Stella area of Plaquemines Parish, Louisiana Gulf Coast, where it is drilling for F. A. Callery, Inc., of Houston. The new well, 2 Hero Unit, is about 1,500 ft. east of the operator's 1 Hero, recently completed oil producer on the south side of the field.

Circle Drilling Co., Lake Charles, La., has contracted with General Crude Oil Co. of Houston for a 9,500-ft. test to be drilled at a wildcat location 10 miles southeast of DeRidder, in Beauregard Parish, southwestern Louisiana.

SERVICE AWARD . . . H. G. Wiesenthal (third from left), oldest employe in point of service, with R. W. Rine Drilling Co., Wichita, Kans., is presented a watch by R. W. Rine, founder of the company and chairman of the board, at a recent dinner given by the company in his honor. In the picture, left to right, are: C. H. Todd, president of the company; Rine; Wiesenthal; Mrs. Wiesenthal; and H. L. Campbell, vice president. Wiesenthal started with the company as a tool dresser in 1923, later drilled on cable tools for many years, and now is pumping several leases for the company at Iuka, Kans. The company was incorporated in 1916, after operating as a partnership for several years.

Picture of a man using

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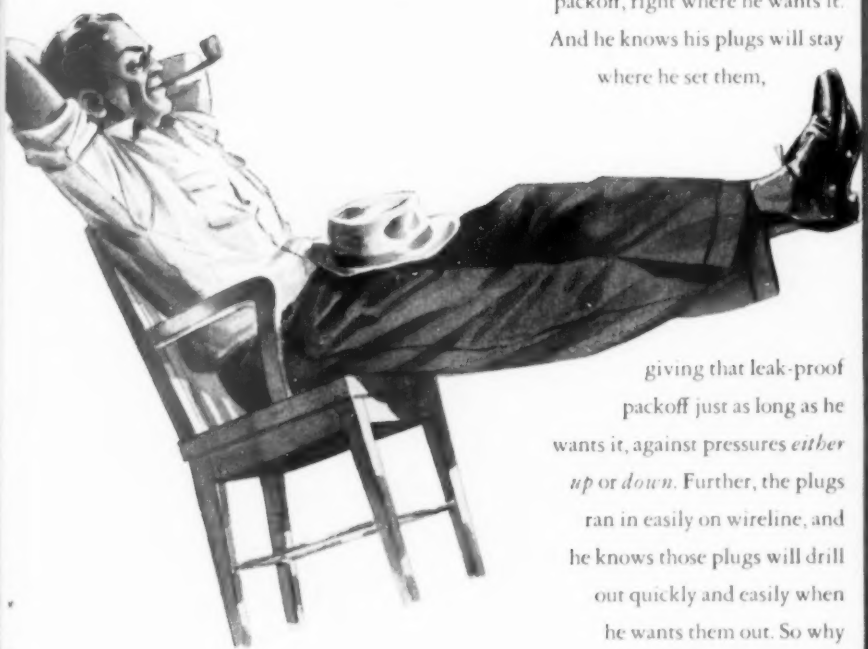
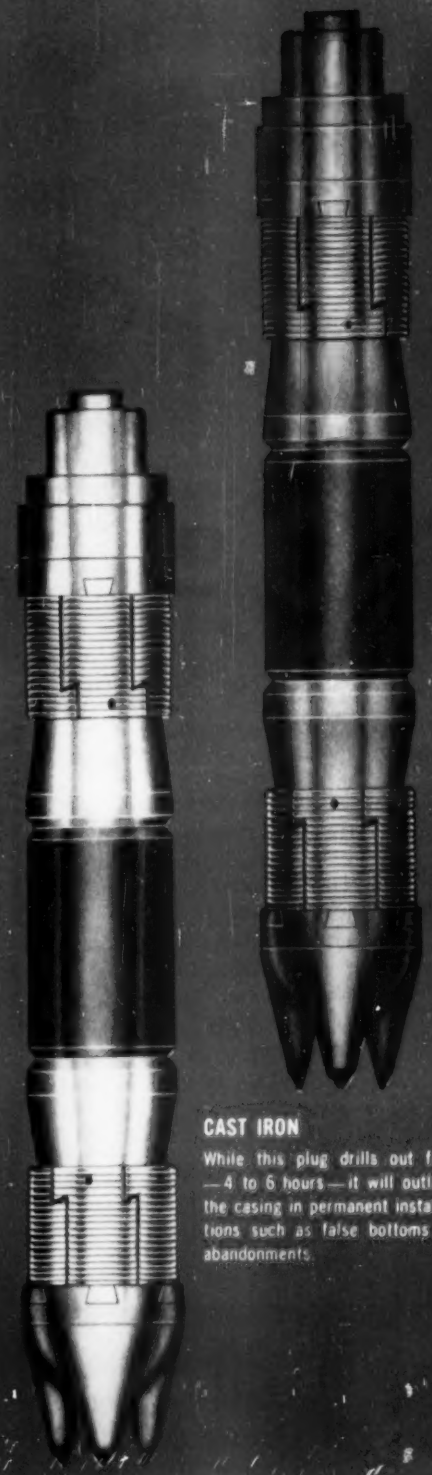
Comfortable as a clam at high tide, because he hasn't a worry in the world as far as plugs are concerned. He *knows* he has leak-proof packoff, right where he wants it. And he knows his plugs will stay where he set them,



giving that leak-proof packoff just as long as he wants it, against pressures *either up* or *down*. Further, the plugs ran in easily on wireline, and he knows those plugs will drill out quickly and easily when he wants them out. So why shouldn't he be cheerful!



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Location, on Long Bell Lumber Co. holdings in 22-3s-7w, is 9 miles from nearest production, the Hurricane Creek field.

T. J. Conway Drilling Co. is contractor on 3,000-ft. wildcat test Harvey J. Weir & Son of Opelousas, La., have located at 1 Fleming, in the C NE SW 17-10n-18e, a mile south of Sucarnoochie, and about 1½ miles north of Porterville, in Kemper County, East Central Mississippi.

Union Rotary Corp., Mount Pleasant, Mich., is moving in tools for a 7,500-ft. test it has contracted to drill for Carter Oil Co. at 1 Lemcoll, in the SE SW SW 9-25n-10w, Paradise Township, Grand Traverse County, Michigan.

Hayes & Sprague, Inc., will drill a wildcat test for General Petroleum Corp. at Ballinger Canyon, in Cuyama Valley, California. The new operation is designated as 1 Ballinger Canyon Unit. Location is in 31-10n-24w.

Davis & Davidson will drill a 4,300-ft. test for Max Pray of Chicago at a wildcat location 6 miles northwest of Orange Grove and about 4 miles northwest of the Wade City field, in Jim Wells County, in the lower Texas coastal area. The new test will be 2 Willie Banker, Jr., with location in the J. Poitevent Survey 1.

O. W. Dyer Drilling Corp., Houston, is drilling on a 12,500-ft. wildcat test in the Lake Verret area of Assumption Parish, coastal Louisiana. Contract is for Monterey Exploration Co., operating from Lafayette, La. Location is on a state water-bed lease in Township 14s-13e. It is east of the West Lake Verret field, in eastern St. Martin Parish.

ACTIVE ROTARY RIGS*

Area—	Week ended 7-27-53	Change week ended 7-20-53	Change week ended 7-28-52
Gulf Coast	565	+ 8	+ 43
N. & W. Tex.-N. M.	790	—10	+ 30
Ark.-N. La.-E. Tex.	147	— 8	+ 14
Oklahoma	328	—10	+ 41
Kansas-S. Nebraska	167	+ 2	+ 30
Illinois-Eastern	156	+ 2	+ 14
Rocky Mountains	266	+ 1	+ 39
Pacific Coast	172	+ 2	+ 14
Total U. S.	2,591	—13	+225
Western Canada	169	+ 1	+ 14
Total	2,760	—12	+239

*Courtesy Hughes Tool Co. Trends in drilling activity in the United States, Gulf Coast, and Arkansas-North Louisiana-East Texas are shown on pages 150 and 151.

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REFINING

Contract Let for Cat Reformer At Pan Am's Texas Refinery

TEXAS CITY, Tex.—Pan American Refining Corp. has let contract for construction of a 21,000-bbl. per day catalytic reforming unit at its refinery here.

The unit, which will be erected by M. W. Kellogg Co., will use a process developed jointly by Pan Am and Standard Oil Co. (Ind.) when completed in late 1954.

Construction of the reforming unit is the final phase of an expansion program which will increase the refinery's capacity this year to 135,500 bbl. daily. This program includes expansion of the alkylation unit, a new combination catalytic cracking and polymerization unit, and some revisions to present thermal equipment. In addition, substantial increases in office, engineering, research and development buildings are being made.

Corpus Refining Expansion Project Nearing Completion

CORPUS CHRISTI.—Completion is scheduled within 60 days on the current expansion program of Corpus Christi Refining Co.

The new construction will boost capacity of the refinery from 1,700 to 7,500 bbl. a day. Texas Engineering Construction Co. here is doing the work.

The company was reorganized last August. Chief product made at the refinery is jet-fuel, with byproducts of diesel fuel, axle oil, and other residuals. The company has a contract to supply the Government with 56,000,000 gal. of jet-fuel during the next 11 months.

Cooperative Refining Assn. Gets Crude From Conoco

PHILLIPSBURG, Kans.—Cooperative Refining Association has made arrangements to obtain about 5,500 bbl. daily of crude for its 8,400-bbl. refinery here from Continental Oil Co.

Approximately 3,500 bbl. will come from Wyoming producing areas, and the remaining 2,000 bbl. will come from Little Bear pool, Washington County, Colorado. All of the crude will be received through Platte Pipe Line Co. terminals.

Danaho Plans to Double Texas Refinery's Output

PETTUS, Tex.—Danaho Refining Co. will double the capacity of its refinery here next year, adding new catalytic cracking and catalytic polymerization facilities.

A new crude unit, due to go stream by February 1 will raise the capacity of the plant from 4,000 to 8,500 bbl. per day.

Danaho has contracted with Socony-Vacuum Oil Co., Inc., to license the T.C.C. process. A 5,000-bbl. per day unit is expected to be on stream by July 15, 1954. This unit will incorporate concurrent reforming, with fresh

NELSON REFINERY CONSTRUCTION INDEX

Appears in the first issue each month.

Explanation—"News Items That Appear in Quarterly Cost Indexes," July 7, 1952, pages 105 and 106.

Compiled by W. L. Nelson—Petroleum Refinery Consultant—Tulsa.

Indexes of Individual Equipment Items—January, April, July, and October.

Index (1946 = 100)

	1948	1949	1950	1951	1952	April 1953
Pumps, compressors, etc.	127.0	135.9	138.2	155.9	155.6	158.8
Electrical machinery	127.6	130.9	134.9	154.3	152.4	153.7
Internal combustion engines	116.9	124.8	126.0	146.1	146.5	146.1
Instruments	120.0	122.0	127.8	142.3	146.2	148.1
Heat exchangers	130.0	133.0	140.0	152.0	165.8	172.4
Miscellaneous equipment average	*122.1	*121.6	*126.2	*145.1	153.3	155.8
Materials component	139.3	143.6	149.5	164.0	164.3	168.5
Labor component	128.0	137.1	144.0	152.5	163.1	170.2
Refinery construction index	132.5	139.7	146.2	157.2	163.6	169.5

*Used in computing the Nelson Index until April 1952. These are slightly different than the average of the Miscellaneous Equipment Items shown above.

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naphtha feed ranging from 10 per cent to about 27 per cent of total fresh feed to the unit. This practice will contribute on the average, about 15 octane numbers to the gasoline product.

Polymerization capacity will be expanded from the present 50 bbl. per day to 300 bbl. daily, with completion of the new unit scheduled for mid-May 1954. Danaho was recently granted a certificate of necessity providing rapid amortization on the following basis: 15 per cent of $10,800, 45 per cent $250,000, and 65 per cent of $2,410,000.

First-Half Dividends Up $12,500,000 Over Last Year

WASHINGTON.—Publicly reported cash dividend payments of oil refining corporations during the first half of 1953 totaled $484,700,000 compared with $472,200,000 in the corresponding period last year.

Dividend payments in June alone, the Department of Commerce reported last week, amounted to $233,400,000 against $214,200,000 in June 1952.

The department report commented on the sizable increases in the refining and machinery industries as resulting from higher dividend rates and a larger number of shares outstanding. Refining dividends accounted for more than 25 per cent of the dividends reported by all manufacturing industries in June.

Refining Briefs

LOS ANGELES. — A 15,000 - bbl. thermofor catalytic reformer (TCR) for upgrading low quality gasoline is being erected at General Petroleum Corp.'s Torrance refinery near here. The contractor, Bechtel Corp., expects to complete the $9,000,000 project by July 1954.

WHITING, Ind.—Standard Oil Co. (Ind.) refinery here has received the National Safety Council's award of honor for industrial accident prevention. Refinery workers in 1952 cut accident frequency 68 per cent and severity 52 per cent below average.

BAYTOWN, Tex.—As a result of an agreement which has been approved by members of the Baytown Employes Federation, an independent union, approximately 4,700 hourly workers at Humble Oil & Refining Co.'s refinery here are to receive a 4 per cent wage boost. The increase amounts to 7 to 11 cents an hour.

BAKERSFIELD, Calif.—A ruptured pump house oil line caused an explosion and fire at Douglas Oil Co.'s 8,400-bbl. refinery near here recently. No injuries were reported and damage was estimated at $125,000.

PORT ARTHUR, Tex. — An esti-mated 5,000 workers at Gulf Oil Corp.'s 245,000-bbl. refinery here have accepted a 4 per cent increase in wages, reversing a previous decision. A union spokesman said the offer was rejected initially because it did not contain reopening clauses.

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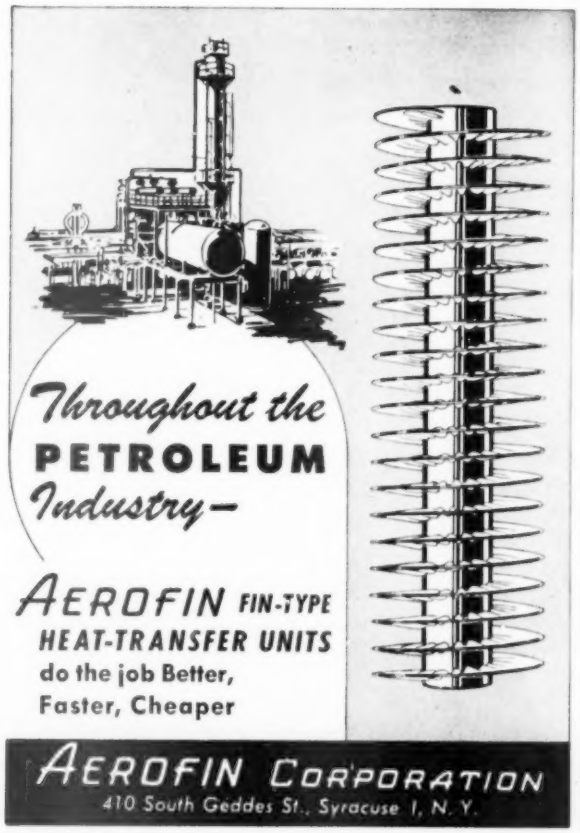

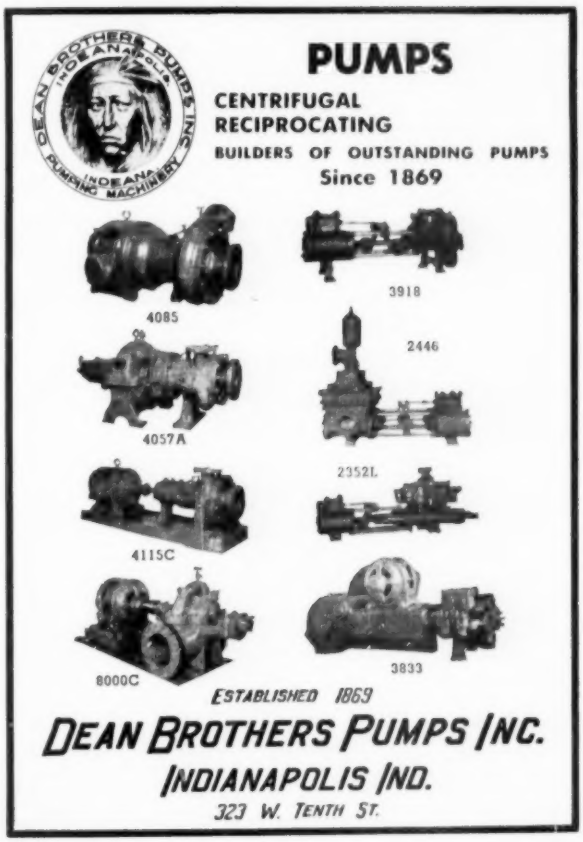

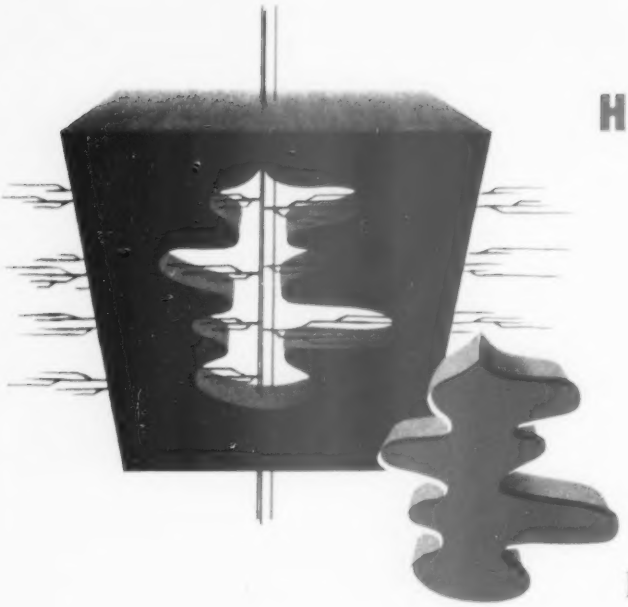

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MCA has proved its value many times in destroying skin effect in sand and limestone formations when these conditions are present. Yet it does not pretend to be a cure-all for every production difficulty. Analyses of the well to determine the cause of low oil production must not be neglected.

Application in a new well may be done through the production packer already in the well. MCA is placed in tubing and displaced into the formation, leaving the perforated or open-hole section just covered with the solution. Usual closed-in time is one to two hours, after which recompletion can follow.

Frequently, natural flow occurs, which simplifies recompletion. In other cases, well conditions will require swabbing to remove treated blocking material and start flow of oil to the well bore.

MCA can be a valuable servant. Take advantage of it. Phone your nearby Halliburton representative. Or contact Halliburton Oil Well Cementing Company, Duncan, Oklahoma.

HALLIBURTON

YEARS AHEAD IN PRODUCTION IMPROVEMENT TECHNIQUES!

EXPLORATION

"Wildcats" Revitalize Cherokee Basin

by Philip C. Ingalls

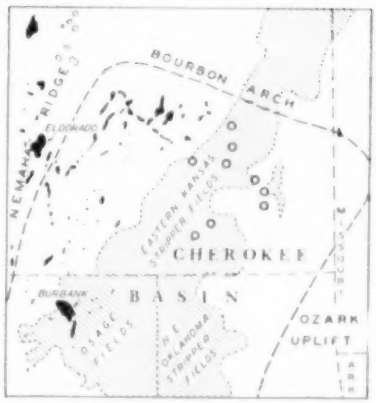
THE stripper area of the Cherokee basin of southeastern Kansas and northeastern Oklahoma is the scene of an intense shallow-drilling campaign which, thanks to formation fracturing, is developing virgin oil in increasingly respectable quantities.

Though this area has been an important producer of oil since about 1895 nearly all of the wells drilling there today can be rightfully called wildcats. The objective oil-bearing sands of Pennsylvanian age have a widespread distribution but they are lenticular, ragged, and highly erratic and there is little if any information available from the old wells for guidance. The only reason that the wells should not be called wildcats is that there is or once was production within the immediate vicinity of their locations.

Southeastern Kansas is currently the most active wildcat and development area in the basin. Well-servicing-company men and operators in the area estimate that there are in the neighborhood of 500 rigs in eight counties of southeastern Kansas. These rigs are digging for oil at depths ranging from 200 to 2,000 ft. Wells are completed for initial pump gages of from 10 to 200 or more barrels of oil daily. The Cherokee-Bartlesville and the Marmaton-Squirrel sands are of primary interest but in some areas the Marmaton-Peru and the Mississippi-"chat" are proving worth-while objective.

These shallow wells are being drilled by small independent operators using cable tools. Many are completed by cementing 2-in. tubing and fracturing. The crude in this area has been found well suited as a transporting medium for the sand and in some instances is used in fracturing operations. Wells are pumped through strings of 1-in. pipe which serve as sucker rods.

The current surge of shallow drilling has been building up to the present high level of activity for about 2 years. The obvious question is: "How is it that an area which has been so thoroughly drilled in the past is still capable of yielding substantial oil wells?" The answer is: "In the localities now being drilled the sands are tight and shaly.



Circles show areas of greatest concentration of drilling activity in the Cherokee basin.

The old practice of shooting these sands with glycerin was ineffective. Wells were too small for profitable operation and were produced but a short time or were plugged after initial testing. These same sands respond beautifully to formation fracturing." Some wells fractured as long ago as 2 years are still making up to three times more oil than wells in the same area would initial after shooting.

Complete and specific information on this area is difficult to obtain. The area is not regularly scouted by major companies nor by rotary-bit manufacturers. Most of the new oil is trucked from the leases so that detailed production information is not readily available.

For many years prior to the past few months southeastern Kansas and northeastern Oklahoma were considered almost exclusively as a secondary-recovery province. The development of water floods dominated the area's activity. It has been estimated that projects now in existence will ultimately recover more than 1 billion barrels of secondary oil. These water-flood operations, unlike the virgin-oil drilling activity, are for the most part highly engineered projects and are developed by major companies and well-established independents.

The older formations in the deeper parts of this comparatively shallow (5,500 ft.) basin, which lie just to the east of the Nemaha ridge, are still a notable future province. They will have to wait a while longer, however, because of the current attractiveness of the shallow Pennsylvanian sands.

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

MISSISSIPPI . . . Gulf Refining Co. has found more oil sand in 1 Bailey, deep test in Soso field, Jones County. Recovery on a core at 11,954-12,004 ft. was 24½ ft. of oil sand. Carter Oil Co. has opened a small gas pool in Clay County at 1 Mattie M. McFadden et al., 36-16s-5e, in the Black Warrior basin.

MONTANA . . . Carrol J. Kirk recovered 250 ft. of free 51.8°-gravity oil at 1 Stow, NW NW SE 14-7s-22e, Golden Dome structure, Carbon County, for an apparent new pool discovery. The test was taken in the Greybull or Dakota at 5,844-88 ft. The Golden Dome structure is 4 miles east of Dry Creek field.

WEST TEXAS . . . Continental Oil Co. has extended new McCollum (Wolfcamp) field in Andrews County ¼ mile south at 2 McCollum & Weibusch. The field's second well was completed for a calculated daily flowing potential of 1,244 bbl. of oil. The potential was based on an actual 6-hour flow of 311 bbl. through 1-in. choke and perforations at 8,917-27 and 8,988-9,014 ft. Continental has a Strawn discovery in Crockett County at 2-C Harris, 4-BB2-Francis Boren Survey, 12½ miles south of Texon.

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KANSAS

Activity Up on the Nemaha Granite Ridge

Activity is up on the Nemaha granite ridge in southern Kansas counties, particularly in Cowley and Sumner counties.

Laura Jane Oil Co. has a wildcat under way at 2 C. Bollack, CNL SW SW 16-32s-6e, 1½ miles east of North Turner pool in Cowley County. At 1 Snyder in the SW SW SW 25-32s-7e, 2¼ miles east of Countryman pool in west central Cowley Earl Wakefield is under way. Also in Cowley Iverson and Associates have a test at 1 Burr, SE SW NE 36-34s-3e, 1 mile northwest of Bergkamp Northwest pool.

The Texas Co. is moving in with rotary tools in Sumner County at 1 Hammers, SW NW NW 1-30s-3w, 3 miles northwest of Latta pool in the north part of the county. Lance Hill et al have a location staked in eastern Sumner County at 1 Cradit, SE SE SE 1-33s-2e, 1¼ miles south of Margaret pool.

Twelve New Pools Named in Kansas

The Nomenclature Committee of the Mid-Continent Oil & Gas Association recently gave names to twelve new oil pools in nine Kansas counties.

Eastern Kansas . . . Finnerty pool is being opened in Coffey County in eastern Kansas on the Bourbon arch at Lockhart and Waite 1 Finnerty, CN½ NW SW 12-21s-13e. The pool discovery well is in completion states from the Burgess sand at 1,728-39 ft.

Southern Kansas . . . Cowley County has a new pool, David Northwest, at McNeish and Gralapp 1 O'Hara, NE NE SW 10-31s-4e. The pool opener was completed for 50 bbl. of oil per day from the Bartlesville sand.

Central Kansas uplift . . . Clarence and Hill Northeast pools are Barton's new producing areas. Schermerhorn Oil Corp. opened Clarence pool in Barton County at 1 Merton, NW NE SE 35-19s-15w, in the Lansing. Graybol Contracting Co. et al 2 Murphy is the pool discovery well for Hiss Northeast, NW SE NW 29-20s-13w, completing in the Lansing. Ellis County has two new pools, Dinkel and Reichert. Alpine Oil & Royalty Co. 1 Dinkel, NE SW NE 23-13s-17w, is completing in the Lansing to open Dinkel pool, and Victor Drilling Co. 1 Reichert is completing in the Lansing. Reichert pool is located in the NW NW NE 9-15e-19w. In Pratt County H. L. Moore opened Iuka-Carmi Northwest pool at 1 Horner, NE NE NW 26-26s-13w. The new pool is completing in the Arbuckle. Rooks County has two new pools. C-G Drilling Co. 1 Ordway "A," SW SW NE 16-10s-18w, is completing in the Lansing to open Williams Southeast pool. G-M-R Oil Co. is opening Williams Northwest pool at 1 Williams, C N½ NE NW 6-10s-18w. Stafford County has a new pool at Petroleum, Inc. 1 Wood, SE SE SW 33-22s-14w, completing in the Arbuckle to open Wood pool.

Forest City basin . . . At the extreme southwest side of the Forest City basin White and Ellis have opened Bradfield Northwest pool at 1 Jones, NE SW SW 13-21s-10e, Lyon County. The Viola discovery was completed for 25 bbl. of oil per day.

Salina basin . . . At the extreme southern end of the Salina basin in Marion County Quarry Siding pool has been opened at H. B. Ratzlaff et al 1 Groening, NE NW SW 16-19s-4e. The Mississippian discovery was finaled for 30 bbl. of oil per day.

New Discovery Due Pawnee County Area

Morrison Drilling Co. has an assured pool opener at 1 Harper, SE NE SE 4-20s-18w, 6 miles northeast of Oro pool in the northern part of Pawnee County on the southwest side of the Central Kansas uplift.

Operator has drilled plug and is testing in the Arbuckle. A drill-stem test at 4,002-24 ft., open 1¾ hours, recovered 2,820 ft. oil and 180 ft. of muddy oil. Total depth is 4,024 ft.

CALIFORNIA

First Well Being Completed in Wheeler Ridge Shallow Pool

Standard Oil Co. of California was in process of completing 42 K.C.L.-33 in a 4,000-ft. Olcese (middle Miocene) sand at Wheeler Ridge, southeast San Joaquin Valley. Several deep tests of Richfield Oil Corp. had shown the zone to be productive but the Standard well would be its first completion.

Drilled to 4,047 ft., 42 K.C.L. flowed at an estimated 1,000 bbl. daily rate during the last 30 minutes of a 1½-hour formation test at 3,990-4,047 ft. Gravity of the crude was 38° A.P.I. Following the test the operator

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set 7-in. casing at 3,980 ft. prior to completion.

Two locations west of the Standard well, Richfield 34-28 Gordon in mid-June flowed at a daily rate of 1,374 bbl. on a test at 3,875-3,960 ft. The well is being carried to the 10,000-ft. Eocene, but this Olcese showing led to the staking of 42 K.C.L. Richfield was preparing to drill 144 Gordon between these two wells as an Olcese test.

Northwest Belgian Anticline Test

Honolulu Oil Corp. 1 Honolulu-Watson-C.C.M.O. in the Northwest Belgian Anticline area of Kern County showed promise of being a new pool discovery. On a formation test at 2,853-81 ft., frothy oil of about 30° gravity was produced at a substantial but unestimated rate. Following the test, coring was continued and at last reports a depth of 3,055 ft. had been reached.

Nearest production to the Honolulu test is Moriqui Exploration Co. 4 Anderson in SW NE 15-30s-21e, almost ½-mile northeast. It was completed last March as a new Oceanic pool discovery, flowing 37°-gravity crude at an 800-bbl. daily rate from 3,450-90 ft. A. J. West was preparing to complete 2 Tide Water Associated-fee as a west offset to this discovery, and Moriqui has staked 5 Anderson as a south offset.

TEXAS

NORTH TEXAS

Fisher Strike is Caddo Lime Well

B. M. Hester & Sons 1 Gena Dooley, 4 miles northwest of Claytonville, completed as a good flowing well, rating a daily potential of 360 bbl. of oil. The gage was through ½-in. choke from perforations at 6,786-6,802 ft. Nearest production is the Claytonville Canyon reef field, 3½ miles to to the southeast. The 1 Gena Dooley is the first Caddo well in that area of the county.

Jones County . . . The Texas Co. 6-A Anderson, wildcat 3 miles northwest of Lueders, completed as a King sand discovery. Pay section was open hole between 2,052-54 ft. Operators swabbed 62 bbl. of oil in 3 hours, then pumped 101½ bbl. of oil with no water in 9 hours. Calculated potential was 270 bbl. of 40° oil daily.

R. O. Coe 1 Harp, in the Montgomery-Tannehill field, extended Saddle Creek pay and opened a new horizon for Montgomery field. Potential on the pump was 36 bbl. daily from pay at 2,260-65 ft.

Nolan townsite . . . General Crude Oil Co. 1 Nolan Townsite Unit swabbed acid residue, oil and salt water after treating an open hole section from 3,760-83 ft. Testing was to continue.

EAST TEXAS

Franklin Test Checking The Rodessa

Humble Oil & Refining Co.'s 1 Ballard, projected deep wildcat in Franklin County, was making a thorough examination of the Rodessa before drilling ahead on 14,500-ft. contract.

Operators stopped to run casing at 8,531 ft. after drill-stem testing oil shows at 8,161-8,328 ft. Production test on perforations between 8,232-50 ft. gaged 88 bbl. of oil a day, testing 42.7°.

Carter Gragg Oil Co. 1 M. H. Anderson, long southwest offset to the Reka pool discovery well, Navarro County, developed 3,500 ft. of oil on a drill-stem test in Pettit limestone at 6,845-6,925 ft. The tester was open 1 hour. Location is 1½ miles northwest of Winkler townsite.

New Longview test . . . Robert Cargill was reported planning another test for the Longview city limits, with projected depth of 8,000 ft. The proposed operation will be 1 Cargill Unit, located on the northeast edge of town in the Alex R. Jordan Survey. Cargill's first well for the city limits was 1 Mott Unit, which had a completion potential of 185,000,000 cu. ft. of gas a day from the young section at 6,872-6,913 ft.

WEST TEXAS

Confirmation Wells For New Pools

Continental Oil Co. added a second Wolfcamp producer to its new McCollum field in Andrews County, and had a third well showing oil. The ¼-mile extension is Continental 2 McCollum & Weibusch, which finished for a daily potential of 1,244 bbl. of oil on 1-in. choke from pay at 8,917-27 and 8,988-9,014 ft.

Continental 3 McCollum, west of the discovery, swabbed 190 bbl. of new oil in 13 hours from perforations between 8,857-8,920 ft.

Anderson-Prichard Oil Corp. 1-G University, west offset to the 1-E University Devonian discovery, found additional saturation in testing from 12,333-12,530 ft. Recovery on a 3-hour test included 1,020 ft. of oil.

The 1-G University reported top of the Devonian at 12,320 ft. which was slightly higher than the discovery. First test of the Devonian at 12,321-12,425 ft. recovered 10 ft. of free oil, 25 ft. of oil and gas-cut mud and 1,980 ft. of slightly oil-cut water blanket.

Spraberry extension . . . Seaboard Oil Co. and Phillips Petroleum Co. 1 Herman Pettaway, Section 40, developed flowing oil from the Spraberry, approximately 4 miles west of the south end of Spraberry pool proper. On test from 6,695-6,850 ft. oil flowed in 70 minutes, making 8 bbl. in 15 minutes through 1-in. choke, and 16.5 bbl. in 1 hour through ⅜-in. choke. Top of the Spraberry was 6,644 ft., minus 3,728 ft. Contract depth calls for 9,000 ft. to test the Pennsylvanian. Location is about 3 miles northeast of the 1-well Sparenburg Pennsylvanian pool.

Deep test scheduled in Hockley . . . Stanolind Oil and Gas Co. will drill 1 Dorothy L. Slaughter as an 11,000-ft. wildcat in 36-36-Zavala County Lands Survey, southern Hockley County. Location is 2½ miles southeast of Clauene and 2 miles northwest of Honolulu Oil Corp. 1-A Lockett, a dry exploration at 12,214 ft.

SOUTHWEST TEXAS

Oil Production Opened In Cayo del Oso Field

Southwestern Oil & Refining Co.'s second well for the new Cayo del Oso field, in Nueces County, has been completed as an oil producer, flowing 143 bbl. of 43°-gravity oil per day through 10/64-in. choke from casing perforations at 6,645-48 ft.

The new well, 1 Eastland, is a northeast offset to the discovery well, 1-D State, completed as a gas-distillate producer from the same pay with casing perforations at 6,655-65 ft. The well also tested gas from casing perforations in a shallower zone at 6,581-86 ft. and will be dually completed.

Wilson County Wildcat Makes Chalk Producer

Lake Rice Mill has a new oil-discovery well northwest of the one-well Lavernia field, 3 miles east of Lavernia, in northern Wilson County. The well, 1 Mueller, producing from a crevice in Austin chalk with hole open at 2,797-2,855 ft., flowed 127.28 bbl. of 32.9°-gravity oil on a 24-hour gage through ⅛-in. choke with gas-oil ratio of 300 cu. ft. per barrel. Tubing pressure was 265 psi.

New Gas Area Opened

A new gas-producing area, located west of the Big Foot oil field, 10 miles northeast of Pearsall, in Frio County, has been opened by George Parker and A. T. Jergins & Sons, Ltd., with the completion of their 1 Berry. The discovery well flowed at the rate of 4,100,000 cu. ft. of gas per day from open hole at 2,975-3,001 ft. The gas is dry. Location is in the Matthew C. Patton Survey.

TEXAS GULF COAST

Gas Production Opened In Two Brazoria Areas

Two more Brazoria County wildcats, located only 4½ miles apart, have been completed as gas-discovery wells. One, Dow Chemical Co. 1 fee, in the Maurice Henry Survey, 1½ miles northeast of Velasco, flowed at the rate of 33,000,000 cu. ft. of dry gas daily from sand at 7,002-06 ft. The other, Brazos Oil & Gas Co. 1 Fletcher, flowed at the rate of 28,000,000 cu. ft. of dry gas daily from sand at 5,266-70 ft.

Dow Chemical's new well is about 5 miles south of the Stratton Ridge field and about 4½ miles northeast of Bryan Mound dome. The Brazos well, 4½ miles to the northeast, is about 3½ miles southeast of the Stratton Ridge field.

New Producers Confirm Bender Field Discovery

Sinclair Oil & Gas Co. has completed two additional wells in its new Bender field, in southern Montgomery County. One, east offset to the discovery well, completed last April, confirms the oil-producing Yegua sand opened by the discovery well. The other, a location northwest of the discovery well, proves a shallower pay zone with gas-condensate production.

The east offset and confirmation well, 1 Lawndale, flowed at the rate of 208.13 bbl. of 34.5°-gravity oil per day through 10/64-in. choke with sand open through casing perforations at 6,072-75 ft. The discovery well, 1 Bender, is perforated at 6,076-78 ft.

Northwest of the discovery well, the operator's 2 Bender flowed at the rate of 3,020,000 cu. ft. of gas daily through ¼-in. choke. The gas carried a spray of 56.4°-gravity condensate. The new pay is open through casing perforations at 5,787-95 ft. Hole had been drilled to 6,198 ft. but did not show for commercial production in the discovery well's pay zone.

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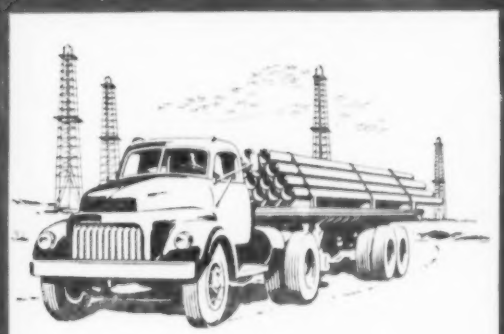

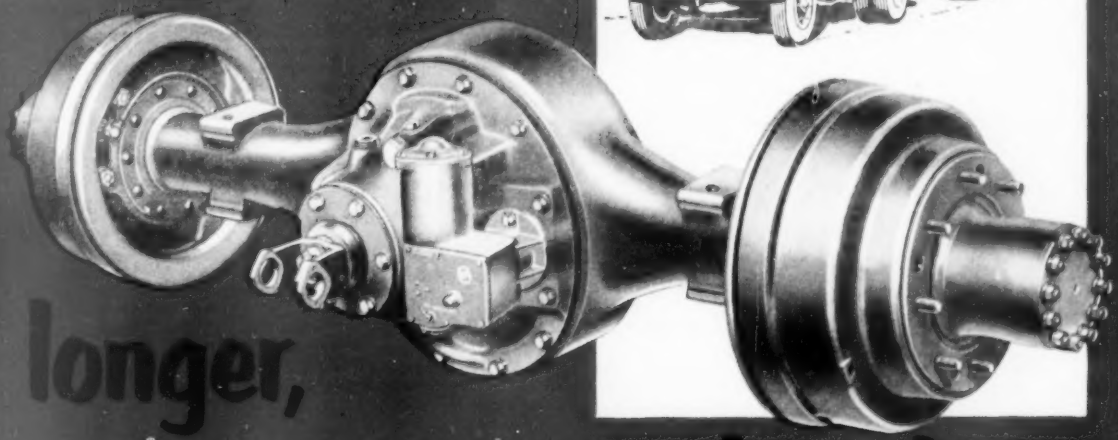

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ROCKY MOUNTAIN

Record Number of New Locations Made in Region

A total of 115 new locations were announced during the past week in seven states of the Rocky Mountain region. The new burst of activity bore out earlier predictions of an increasing drilling program in the latter part of the year, and is believed to have set a new record for new locations in the region during a single week.

Thirty-three locations were staked in Wyoming. Of these, nine were exploratory wells. Montana had 23 new locations, including seven wildcats. A majority of the development drilling scheduled for this state was in Toole, Teton, and Liberty counties, where a heavy percentage of drilling is by independent operators using cable tools.

Colorado had 22 first reports during the week, with the Little Beaver-Badger Creek development in Adams and Washington counties furnishing a large part of the total. There were eight wildcats in the Colorado total.

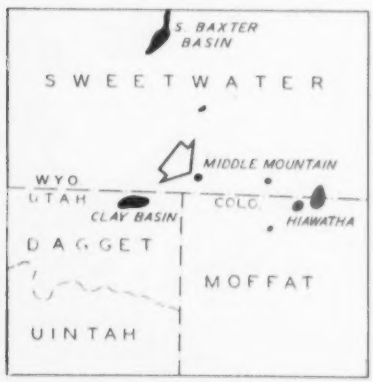
Western Nebraska had 10 new locations announced, with seven of these wildcats, giving the area the highest percentage of exploratory locations among the states of the region. Northern New Mexico, with 21 locations, had only two wildcats, reflecting the heavy percentage of development work being done by San Juan basin operators.

North Dakota had three first reports, including one wildcat. There was one exploratory well staked in South Dakota, and Utah had two first reports, both exploratory.

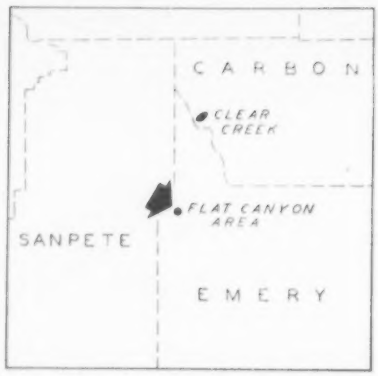
WYOMING

Two Deep Tests Located In Powder River Basin

Union Oil Co. and Brazos Oil & Gas Co. have made location for two deep wildcats in the south central Powder River basin. These operators will test to Frontier at about 11,500 ft. at 1 Unit, C SW SE 29-40n-73w. The well will be the first test of the Powell block, now being unitized. Location is about 25 miles east of Salt Creek field.



Arrow points to Sweetwater County's Middle Mountain area where Stanolind Oil & Gas Co. has recovered gas at the rate of 5,500 M.c.f. per day from the Mesaverde at 2 Unit, C SW NW 11-12n-103w. The discovery in this unit, made during 1952, created new interest in the Mesaverde formation throughout the Green River basin. The discovery well made 169 bbl. of oil and 1,000 M.c.f. of gas per day from the Mesaverde at 6,534-48 ft.



Arrow points to recent Dakota sand gas discovery in Emery County at Three States Natural Gas Co. 1 Kearns, SE NW NE 27-16s-6e, in the Flat Canyon area. The discovery was completed for a potential of 7,000 M.c.f. of gas per day from the Dakota, topped at 7,002 ft. The Flat Canyon strike is located 20 miles southwest of Clear Creek field where production is from Ferron sand. The Dakota is a new pay for the Wasatch plateau area of Utah.

The second deep test of the basin by these operators is 1 Moore Sheep Co., in NE 4-40n-76w, which is to be a 13,500-ft. test to Lakota.

NORTH DAKOTA

Devonian Has Slight Show In Billings County Wildcat

Amerada Petroleum Corp. recovered poor to fair shows in cores of the Devonian at 1 May, C NW NE 9-139n-100w, in the Fryburg area of Billings County. On drill-stem test of the interval 10,658-10,699 ft.; however, the recovery consisted only of oil-cut water cushion and salt water. Top of the Jefferson member of the Devonian was at 10,660 ft. The well has been established as an apparently commercial producer in Madison, and will drill for deeper tests before attempting completion in that zone.

SOUTH DAKOTA

Ziebach County Wildcat Logs Mission Canyon Show

Ward Dayton logged oil stains in the Mission Canyon at 1 Olson, NE NE SE 35-12n-20e, Ziebach County, but recovered only fresh water on drill-stem test of the zone. The operator is shut down for repairs at 5,020 ft. with top of Mission Canyon and zone tested, not released.

The Dayton well is 10 miles southwest of Kerr-McGee Oil Industries' 1 Cook, SW NW SW 32-13n-22e, which was plugged at 5,993 ft. after recovering small quantities of free oil on test of Red River.

COLORADO

Permian Discovery Swabs at High Rate

The California Co. has swabbed at the rate of 27 BOPH at 1 Baiamonte, SE NE NW 6-7n-66w, in the Black Hollow area of Weld County. The well is producing from the Lyons sand of Permian age, which was topped at 8,916 ft. Total depth of the well is 8,940 ft., and casing was landed at 8,918. The 27 bbl. per hour swab rate persisted over several 8-hour periods of swabbing and no water was reported in any recovery from the wildcat. Fluid level during swabbing operations remained at approximately 1,500 ft. Operator is preparing to complete on pump at the discovery, which is the second pre-Cretaceous discovery for the Denver-Julesburg basin.

Logan County Discovery Testing

British-American Oil Producing Co. is testing at 1 Jorritsma, NE SW SE 12-11n-53w, in Logan County, after recovery of 4,345 ft. of oil on 1-hour test of "J" sand from 5,390-5,402 ft. During the test there was gas at the surface after 3 minutes at the rate of 40,000 cu. ft. per day. Recovery included, in addition to the oil, 900 ft. of gas and oil-cut water with flowing pressure 1,180-1,310 psi. The wildcat is about 2 miles northeast of Armstrong Pool.

NEBRASKA

Natural Gas & Oil Company of Denver is completing 1 Robinson, CE½ SE SE 26-15n-55w, Kimball County, as the Owasco field opener. The opertor swabbed 36.2°-gravity oil at the rate of 20 bbl. per hour from the "J" sand. Top of the producing horizon is at 6,002 ft. with perforations in the zone 6,002-29 ft. The wildcat is 4½ miles east of the town of Kimball.

MONTANA

Discovery Indicated At Golden Dome

Carrol J. Kirk, Montana and Wyoming independent, has tested apparently commercial quantities of oil at 1 Stow, NW NW SE 14-7s-22e, in the Golden Dome structure, Carbon County. The wildcat is east of production in the Red Lodge area at Dry Creek field. Forty-five-minute test of the interval 5,844-88 ft. had gas to the surface in 18 minutes at the estimated rate of 100,000 cu. ft. per day and recovery in pipe was 250 ft. of 51.8°-gravity oil and 180 ft. of heavily oil and gas-cut mud. Formation tested was not identified, but was reported as either the Greybull or Dakota. Production in Dry Creek field is from Greybull.

The well is one of two recent tests of the structure. Ziegler Explorattion recently abandoned 1 Shupak, NW NW NW 15-7s-22e, 1½ miles northwest of Kirk's apparent discovery. Total depth was 5,039 ft. in Frontier. This operator is reported without confirmation as preparing to deepen the 1 Shupak to test deeper horizons on the strength of the current discovery.

ARKANSAS

Arkansas Valley Gas Reserve Chart Available

A Geological Survey chart, covering the geology of the Arkansas Valley, can be expected to aid in the search for gas in northern Arkansas. This new chart, titled "Correlation of pre-Atoka rocks in the Arkansas Valley," by John C. Maher and Robert J. Lantz, may be purchased from the Distribution Section, Geological Survey, Washington 25, D. C., or over-the-counter at 234 Federal Building, Tulsa, and 468 New Customhouse, Denver.

The chart shows the correlation, lithology,

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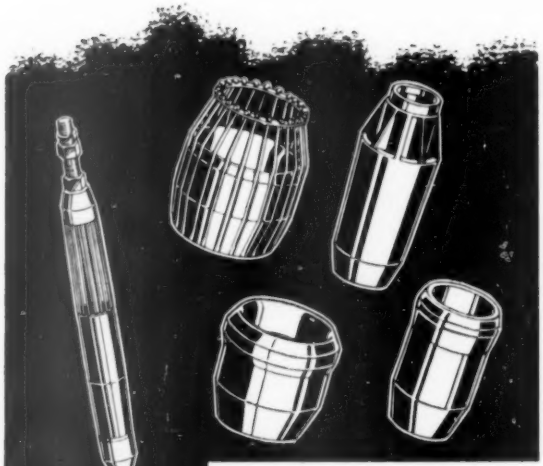

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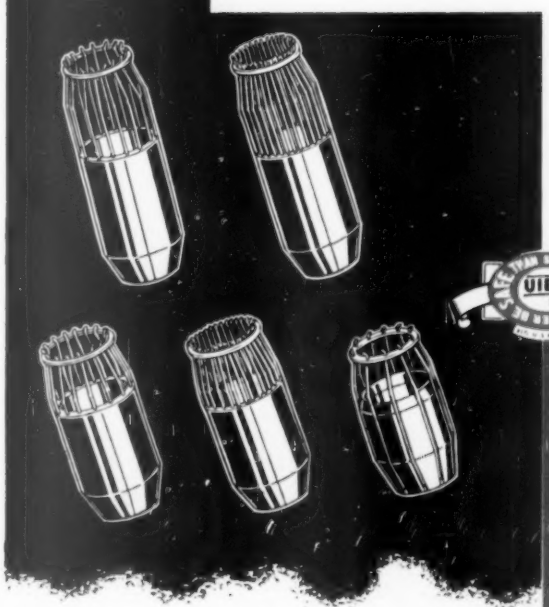

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and thickness of Cambrian, Ordovician, Silurian, Devonian, Mississippian, and Pennsylvanian (Morrow group) rocks in wells in the Arkansas Valley by means of three cross sections.

One cross section of 10 wells extending from west to east in the Arkansas Valley emphasizes the facies changes in these rocks from the lithologic types of the Ozark region to those of the Ouachita Mountains. Two cross sections, one composed of four wells and the other of three wells and a detailed surface section, extend southward from the outcrop area in the Ozark region, intersecting the first cross section in the Arkansas Valley. An index map shows the location of these sections. The text discusses the correlation, facies changes, and the oil and gas possibilities of these rocks.

CANADA

Gas Discovery Reported In Morinville Area

A six-company team of Alberta independents has discovered natural gas in the Ostracod section of the Lower Cretaceous at a wildcat in the Morinville area of Alberta, 20 miles northwest of Edmonton.

The new strike came at Roberts & Associates 1 Morinville, LSD 10, 19-55-25w4, which lies 2½ miles northwest of the Volmer 1 R. W. well that produced some oil and was abandoned and 2 miles west of the Imperial 9 Volmer well that found gas in the Viking sand.

Discovery drill-stem test was run for 80 minutes in the interval 3,620-38 ft. Gas flowed in 1 minute, at maximum rate 3,351,000 cu. ft. daily through ½-in. choke. There was no fluid recovery, and crew is now drilling in the basal quartz below 3,549 ft.

Denhart area . . . Flock Gas & Oil Corp., Ltd., has obtained a flow of natural gas from the Bow Island sands at its initial driller, an exploratory test well in the Denhart area of southern Alberta, 110 miles east-southeast of Calgary.

The new strike came at Flock-CPR 1-15-29 Denhart, LSD 15-29-20-11w4, during test from 2,520-32 ft. Gas flowed in 3 minutes, at maximum rate of 1,200,000 cu. ft. daily. Crew is now diamond coring below 2,765 ft. Hole is scheduled to test all formations down to and including the Ordovician, to around 5,500 ft.

Acme area . . . The D3 Devonian oil discovery well in the Acme area of Alberta, 37 miles northeast of Calgary produced 42°-gravity oil at rate of 68 bbl. daily during initial production tests through a 5/16-in. choke.

The discovery, Delhi-Banff 1 Acme, LSD 13, 22-29-25w4, is 5 miles southeast of the Baysel 1 Linden abandonment. Top of D3 reef was entered at 7,122 ft., and approximately 12 ft. of oil-pay zone was found above the water. Total depth is 7,203 ft., and hole was perforated from 7,125-29 ft. for production tests. Gas-oil ratio during the production tests was 1,200 cu. ft. per bbl. and water cut was 1½ per cent. Testing is continuing.

Geophysical Activity Down in Western Areas

Saskatchewan is the only western province in Canada showing a gain in geophysical

activity, according to the latest survey of operations.

Saskatchewan reports 31 crews operating in the field, an increase of about 75 per cent over the previous report. Alberta has 121 active geophysical units in the field, British Columbia 4, and Manitoba 1. The crews in Saskatchewan are operating in the southern part of the province in the Williston basin.

The number of active geophysical units operating in western Canada totals 157, down about 14 per cent from the March survey.

Imperial Oil, Ltd., leads the field in active geophysical crews operating in western Canada. The company has 24 crews in operation, 23 seismograph, one gravitymeter. Canadian Gulf Oil Co. is second with 15 crews all seismograph. Texaco Exploration has 14 crews active in western provinces, 12 seismic and two gravitymeter. Socony-Vacuum Exploration Co. has 13 crews, 11 seismic, 2 gravity, while The California Standard Co. and Hudson's Bay Oil & Gas Co., Ltd., have eight (all seismic) and six crews in operation, respectively. The remaining crews are distributed among about thirty other companies or groups.

OKLAHOMA

Stephens Discovery Goes on the Pump

Phillips Petroleum Co. 1 Oakman, West Royal pool discovery well in Stephens County, has been completed on pump for 8 bbl. of oil per day. Production at the pool opener is from perforations at 6,070-90, 6,540-60 and 7,465-80 ft. It is located in SE NE SE 2-1n-4w.

Despite the low production at the discovery well there are two good wells to the northwest and west. Phillips 1 Chism flowed 130 bbl. of oil per day from the Pennsylvanian conglomerate on 18/64-in. choke, and the 1 Norman "A," SE NE SW 2-1n-4w, flowed 65 bbl. of oil per day on test. The 1 Chism is located in the NE SE NW 2-1n-4w.

Kendrick Area Production Continues Rapid Growth

The area between the two producing pools in the Kendrick District is rapidly being filled in north and northwest of Kendrick townsite.

Mid-Continent Petroleum Corp. has casing set at 1 Lindsay, SE SE SE 5-15n-5e, Lincoln County. A drill-stem test at 3,385-3,427 ft. recovered 420 ft. of gas-cut mud. Hubbell Drilling Co. 1 Anderson, NE NE NE Section 8, a south effset, is below 3,100 ft. Sun Oil Co. has completed 3 Curry, NE NW NW Section 9, for 243 bbl. of oil in 3 hours guohtrh ¾-in. choke, and is drilling at 4 Curry, NW NW NW 9. The Texas Co. has added a new producer on the north flank of the area at 1 Tipton, SE SE SW Section 4. Rex R. Moor 1 Steger, NW SW SE Section 3, is another Oswego producer in the area. In the SW SE SE Section 6, Barton & Rich Drilling Co. have a Prue well at 2 Sanders.

Big Well Finaled In Royal Pool

Royal pool has a big well at Shell Oil Co. 6 G. L. Rose in the SW SW SE 6-1n-3w, Garvin County.

The well was completed on flow of 605 bbl. of oil in 12 hours with production from

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DW-8

the Arbuckle following acidization. The good well is located on the south side of the pool.

Sohio Petroleum Co. has a new Hunton lime oil well in deep Eola pool to the east. The 2 Henthorne, SE SW SE 7-1n-2w, flowed 130 bbl. of oil per day on 23/64-in. choke from perforations at 6,646-90 and 6,704-30 ft.

Testing is under way after fracture treatment at a discovery well north of Sholem Alechem pool to the southwest of Garvin in Stephens County at Russell Cobb, Jr. and W. B. Davis 1 Martha Jane Edwards, SE NE NW 25-1n-4w. Tussy perforations are at 4,193-4,202 and 4,280-95 ft. The hole filled up 350 ft. of oil in 18 hours. Before casing was placed a drill-stem test at 4,197-4,227 ft. recovered 45 ft. of oil-cut mud and a drill-stem test at 4,285-4,309 ft. got 175 ft. of heavy oil-cut mud.

Testing Under Way at North Freeny Extenders

Jay Simmons is testing a south offset to McClain County's North Freeny pool as is Kenneth Ellison at a west extension try.

Simmons' 1 Kidwell, C NE NE 23-8n-4w, surfaced gas in 47 minutes at the rate of 8 to 10,000 M.c.f. and oil in 55 minutes at the estimated rate of 15 bbl. per hour on a drill-stem test at 10,471-502 ft. Recovery on the test was 480 ft. of oil and 630 ft. of oil and gas-cut mud.

Ellison's 1 Harrison, C SE SW 14-8n-4w, the west extension try, recovered 3,510 ft. of free oil, 1,530 ft. of brackish water and 450 ft. of water on a 2-hour test of perforations at 10,562-566 ft. Ellison also has a wildcat drilling below 3,881 ft. at 1 Featherstone, C NW SE 35-8n-4w, southwest of North Freeny pool.

North Freeny pool was opened by Jay Simmons last winter at 1 Wilson, C SE SE 14-8n-4w, as a Tulip Creek pool.

Test to Begin at Lincoln Discovery

A central Lincoln County discovery well 3 miles east of the south end of Mt. Vernon pool is preparing to test in the Red Fork sand.

Deep Rock Oil Corp. will perforate in the Red Fork pay at 1 Tom Rowan "A," SE SE SE 9-15n-4e. A test of the interval 4,087-98 ft. got gas in 32 minutes estimated at 25 M.c.f. and recovery was 190 ft. of free oil and 20 ft. gas-cut mud. The Second Wilcox test recovered 50 ft. of oil and gas-cut mud at 4,831-45 ft. with 70 ft. of salt water also recovered.

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WRITE FOR DESCRIPTIVE LITERATURE

SIVALLS TANKS, INC.
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MICHIGAN

Most recent production tests at the Jack Uhl 1 McFarlan, NE NW SW 34-20n-3e, Moffatt Township wildcat, Arenac County, a possible new Dundee oil discovery which has been inactive for several months. These most recent tests are after first acid treatment with 500 gal.

The latest production report showed that the 1 McFarlan pumped and flowed 187 bbl. of fluid in 2 days and well was then shut in for lack of storage. Well was not pumped off at the time that it was shut in and only about 10 to 15 bbl. of this amount of fluid recovered was water. After a new storage tank was set well was opened again and flowed, by agitation, about 14 bbl. of oil in less than 45 minutes. Additional testing was in progress.

The 1 McFarlan, drilled early in 1953, first looked like a "hot" new Arenac Dundee oil discovery, but then cooled off. Operations were temporarily shut down at well until high water and mud conditions cleared up. After being acidized in June well showed again as a possible important well.

Dundee objective was logged at 2,911 ft. and hole carried about 1,600 ft. of free oil natural in 17 hours after hole was cleaned out to 2,988 ft., total depth. Considerable trouble was encountered in testing this well natural on the pump, and when tubing and rods were pulled at mid-year for new testing and acid treatment the pump was found to be fouled.

Uhl this week announced another follow-up well in the area, to be drilled immediately. Exact location of this new test was not definitely pegged, but it was expected that it would be in the SE SE SW 34-20n-2e, about ½ mile to the southeast of the 1 McFarlan.

APPALACHIAN AREA

OHIO

National Gas & Oil Co. found gas in the Newburg on the 1 Olive White, Section 20, Clay Township, Knox County, and will tube the well for the present and deepen to the Clinton later. Sand was logged at 1,860-2,410 ft. and gaged 300,000 cu. ft. natural.

H. E. Perkins et al. are drilling a sub-Trenton test on the Frank Hall tract in second quarter of Pleasant Township, Knox County.

On a large block of leases west of the town of Coshocton, B. G. Davis et al. are

New Giant for Anglo-Iranian

A PROUD REPRESENTATIVE of the British Merchant Navy at the recent Coronation Fleet Review was the giant new tanker s.s. *British Sailor*. She is the first of thirteen 32,000-tonners on order for the British Tanker Company, shipping organisation of Anglo-Iranian.

The British Tanker Company now owns some hundred and fifty tankers totalling nearly two million deadweight tons and has a further twenty-seven tankers on order or under construction.

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drilling a wildcat test on C. A. Wallick, second quarter, Jackson Township, Coshocton County.

LOUISIANA

NORTH LOUISIANA

New Pettit Discovery Shut-in in Claiborne

Union Oil Co. of California is building tanks at its Pettit discovery in Claiborne Parish after the strike flowed an estimated 98 bbl. of oil per day through 21/64-in. choke from perforations at 5,112-27 ft. Acid treatment was used prior to the flow. Gravity of the oil is 29°. More testing will get under way after tank construction.

Ouachita Wildcat Drilling Ahead

W. C. Feazel and Associates are drilling ahead in the Cotton Valley at their Ouachita Parish wildcat, the 1 F. N. Wininger, Section 11-18n-1e, 1 mile east-southeast of Eureka in the northwestern part of the parish.

A slight showing of gas was reported in cores of the Bodcaw sand. Cores were taken in the "D," Bodcaw, Vaughn, and Davis sands of the Cotton Valley. A 30-minute drill-stem test at 9,017-75 ft., with ⅜-in. bottom and ¼-in. top choke, recovered 90 ft. of condensate and gas-cut mud and water cushion.

SOUTH LOUISIANA

Second Well Completed In Breton Sound Field

Kerr-McGee Oil Industries, Inc., and Phillips Petroleum Co., joint operators, have confirmed their recent oil discovery in Block 20, Breton Sound, off the coast of Plaquemines Parish, with their second well, completed flowing 204 bbl. of oil per day through small chokes.

The confirmation well, 1-B State Lease 2000, in Block 29, is a location south of the discovery well, on State Lease 1997, in Block 20, and is producing from the same pay zone, one of several potentially productive sands encountered by both wells. Pay in the new well is open through casing perforations at 5,858-74 ft. The discovery well is perforated at 5,864-75 ft. Neither well showed water.

The deep-water drilling barge used on these wells already is drilling at another location, east of the discovery well, at 1-C State Lease 1998, in Block 21.

The area is in open water, 5½ miles north of Breton Island, nearest land. Discovery well was completed July 3.

MISSISSIPPI

Wilkinson County Gets New Wilcox Discovery

Another Wilcox field is in the making in Wilkinson County where Gulf Refining Co. is preparing to complete its 30 Crosby, a stratigraphic test which encountered good showings in the upper part of the Wilcox section.

The indicated well, located in 20-4n-2w, approximately 1½ miles southeast of the Possum Corner field, in the northern part of the county, was drilled to 7,200 ft., and, with casing run to 5,156 ft., is perforating an interval at 5,091-93 ft. Electric log and sidewall cores indicated oil sand at 5,092-97 ft. A subsequent drill-stem test through ¼-in. bottom-hole and ½-in. top chokes got an oil flow at the rate of 115 bbl. per day at 650-psi. pressure.

This is the fourth Wilcox discovery in southwestern Mississippi this year. This discovery, in the upper part of the Wilcox, is in contrast to most of the other southwestern Mississippi Wilcox discoveries, which have been in deeper zones.

NEW MEXICO

WESTERN NEW MEXICO

Humble Test Coring

Humble Oil & Refining Co. 1 Santa Fe-Pacific, 18-6n-1w, rank wildcat in Valencia County, recovered 20 ft. of black shale between 10,791-10,816 ft. and was coring ahead from that depth.

A drill-stem test in shale and sand from 10,613-10,665 ft., open 1 hour and 15 minutes, recovered water blanket and 340 ft. of water and mud which had a slight show of gas. Projected depth of the well is 12,000 ft.

WILDCAT COMPLETIONS

SOUTHWEST TEXAS

Aransas County: Union Producing Co. 11 Tatton, M. Hunt Sur., A-81. Dry. TD 7,515 ft.

Atascosa County: Edwin Eckert & Walter Ehlo, Nora Scott Sur., A-768. Dry. TD 1,996 ft.

E. J. Pearl et al 1 Campbell et al, A. Houston Sur. 192, A-859. Dry. TD 3,210 ft.

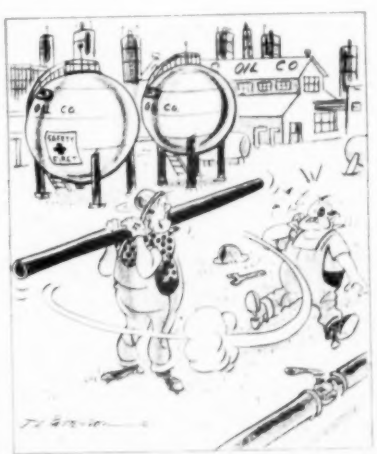
Brooks County: Sun Oil Co. 1 Barrera et al., Palo Blanco Grant, A-258. Dry. TD 6,394 ft.

Duval County: Schimmel Drilling Co. 1 Parr, La Huerta Grant, A-227. Dry. TD 6,225 ft.

Frio County: Fred W. Schield and E. E. Yoakum 1 L. W. Wessinger est., Torres Irrigation & Manufacturing Co. Sur. 416¾, A-734. Dry. TD 4,357 ft.

Jim Hogg County: Humble Oil & Refining Co. 5-D Atwood, San Antonio Viejo Grant, A-327. Dry. TD 3,600 ft.

Lamar Hunt Trust est., 1 Tomoso de Garcia, Jose Marcel Hinojosa Grant, A-367. Dry. TD 5,500 ft.



"Huh? Did you say sumthin' to me, Moreley?"

Jim Wells County: American Republics Corp. 1 Bowden Unit 1, Benton Creek Ranch. IP 17 BOPD, 10/64-in., casing perforations 5,616-26 ft. TD 5,912 ft.

Big 6 Drilling Co. 1 Bingham, R. Hilliard Sur. 16. Dry. TD 5,395 ft.

Sid Katz and W. E. Fox 1 Bennett, G. R. Scott subd., Benton Creek Ranch (South Bentonville area). Dry. TD 5,993 ft.

La Gloria Corp. 1 Schroeder, Burton & Danforth subd. IP 14,100 M.c.f. daily, open flow, casing perforations 7,066-80 ft. TD 9,556 ft. (New field.)

Russell Maguire and Buzzini Drilling Co. 1 Stehle, G. Miller Sur. 9. Dry. TD 6,524 ft.

Maxima Oil Co. 1 Reynolds, P. H. Bell Sur. 32. Dry. TD 5,210 ft.

Kleberg County: Sun Oil Co. 1 State, Tract 24, Baffin Bay. Dry. TD 10,004 ft.

La Salle County: Kirkwood & Morgan, Inc., 2 Beckman, H&GN Sur. 120, A-1064. Dry. TD 5,498 ft.

Nueces County: Alaska Steamship Co. et al. 1 Steiger, Nueces River Irrigation Farms subd. Dry. TD 8,678 ft.

Austral Oil Co. and Phillips Petroleum Co. 1 State, Tract 24, Corpus Christi Bay. Dry. TD 8,834 ft.

Union Oil Co. of California 1 Ruegg, George H. Paul subd., Driscoll Ranch (South Robstown area). Dry. TD 7,004 ft.

Starr County: Sun Oil Co. 1-A J. H. Hall-State, C. B. Simpson Sur. 336. Dry. TD 7,300 ft.

Webb County: Appell Drilling Co. 1 Saldivar, Sur. 657. Dry. TD 5,216 ft.

Humble Oil & Refining Co. 4 Nicholson, R. M. Herrin Sur. 1810. Dry. TD 2,200 ft.

Taylor Oil & Gas Co. 1 Nicholson, Sur. 480. Dry. TD 2,011 ft.

Dulaney Oil Co. 1 Welhausen, GSD&-RGNG Sur. 18. Dry. TD 2,692 ft.

Gasoline Production Corp. et al. 1 Hughes, D. Benavides Sur. 1526, A-2141. Dry. TD 3,562 ft.

Jake L. Hamon and Edwin L. Cox 1 Benavides, Sur. 690. Dry. TD 7,803 ft.

Willacy County: Humble Oil & Refining Co. 6 Sauz Ranch-Nopal, San Juan de Carriotos Grant. Dry. TD 7,242 ft.

Wilson County: Gravis Oil Co. 1 Weldon-Stacey & Blake, J. and C. DeWees Sur. 114. Dry. TD 1,702 ft.

EAST TEXAS

Cherokee County: Striker Oil Co. 1 J. T. O'Connell, F. J. Vallanova Sur., A-52. Dry. TD 3,850 ft.

Freestone County: Robert L. Wheelock 1 F. R. Hill, L. Loggins Sur., A-380. Dry. TD 8,719 ft., elev. 336 ft., Paluxy 6,145 ft.

Hopkins County: Bobby Manziel 1 Simms estate, Levi Landers Sur., A-548. Dry. TD 4,877 ft.

Houston County: Geier-Jackson, Inc. 1 J. V. Meyer, J. L. Milford Sur., A-722. Dry. TD 6,815 ft.

Wise Drilling Account and Windfohr 1 Talford Scott, J. J. Haile Sur., A-40. Dry. TD 7,443 ft., elev. 332 ft., Woodbine 7,248 ft.

Panola County: George R. Brown 1 C. E. Wallace, John McAdams Sur. Dry. TD 7,005 ft.

Smith County: Delta Gulf Drilling Co. 1 Mattie Baker, Michael Draper Sur., A-308. Dry. TD 7,631 ft.

NORTH TEXAS

Archer County: W. F. Bockhoff Trust 3 Calvin, Blk. 10, D. White Sur., A-673. Dry. TD 1,111 ft.

Jack Frost 1 A. B. Steen, C. Ballinger Sur., A-14. Dry. TD 835 ft.

W. A. Lofton 1 J. Conrady, Blk. 4, Clark & Plumb. Dry. TD 999 ft.

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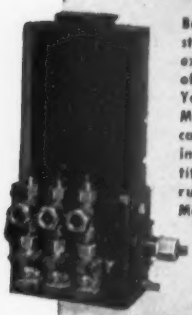
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WILDCAT COMPLETIONS

Lofton and Rester 1 Prideaux, SA&MG Sur., A-444. Dry. TD 4,000 ft.

Clay County: Frank Wood 1-B Clay Dunn, Blk. 139, Byers Bros. Subd. Dry. TD 3,042 ft.

Cooke County: Kay Kimbell 1 Ben Rodgers, Peter Clark Sur., A-232. IPP 30 BOPD, 17°, pay 2,630 ft. TD 2,589 ft.

Kay Kimbell and A. D. Britton 1 Susan Pettit, E. Barnes Sur., A-43. Dry. TD 6,745 ft.

Grayson County: B. M. Hester & Son 1 Mrs. J. M. Buchanan, J. Reeves Sur., A-1021. Dry. TD 6,554 ft.

A. O. Phillips 1 B. A. Butler, Pat Kitchen Sur, A-668. Dry. TD 5,200 ft.

Montague County: A. H. Bruner 1 A. J. Fenoglio, J. R. Watts Sur., A-863. Dry. TD 6,575 ft.

Star Oil Co. 1 Lynn Carlington, W. Tullins Sur., A-736. Dry. TD 7,074 ft.

Jesse W. Wright Drilling Co. 1 Nancy Underwood, John Underwood Sur. Dry. TD 5,906 ft.

Wichita County: W. A. Lofton 1 Roy Gibson, Blk. 271, Waggoner Subd. Dry. TD 2,116 ft.

Wilbarger County: Morgan & Butts 1-E W. T. Waggoner, 38-4-H&TC. Dry. TD 2,500 ft.

TEXAS GULF COAST

Brazoria County: R. L. Daniels and M. W. Messer 1 Clark et al., Francis Moore Sur., A-100. IP 140,000 M.c.f. daily, open flow, Vicksburg 10,815-29 ft. (open hole). TD 10,829 ft. (New field—North Rowan.)

Phillips Petroleum Co. 1-T Houston, E. Andrews lge. IP 334.33 BOPD, 12/64-in. 30.1°, Frio 11,054-65 ft. (casing perforations). TD 11,578 ft. (New pay in Chocolate Bayou field.)

Rowan Oil Co., The Texas Co., and Texas Gulf Producing Co. 1 Goodenough, S. T. Angier Sur., A-7. Dry. TD 11,578 ft.

Texas Crude Oil Co. 1 Burrows, John Peske Sur., A-113. Dry. TD 9,500 ft.

Fort Bend County: Fort Bend Oil Co. 1 George & Collins, John Little Sur., A-52. Dry. TD 8,503 ft.

Johnny Mitchell 1 Cartwright, David Bright Sur., A-13. (Blue Ridge area.) Dry. TD 8,500 ft.

Harris County: Group Oil Co. et al. 1 Graves est. and Taub est. unit, J. W. Bryan Sur., A-159. Dry. TD 7,552 ft.

Jackson County: T. J. Ahern et al. 1-A J. M. Heard et al., Frances Menefee Sur., A-51. Dry. TD 6,815 ft.

Hill & Hill and A. W. Cherry 1 Heard, Frances Menefee Sur., A-51. Dry. TD 7,215 ft.

The Texas Co. 1 Franel, I&GN Sur., Block E, A-197. IP 4,350 M.c.f. daily, casing perforations 3,844-48 ft. TD 5,503 ft.

Liberty County: Floyd L. Karsten 1 Sims, H&TC Sur. 99, A-236. Dry. TD 9,600 ft.

Progress Petroleum Co. of Texas 1 Broussard et al., S. D. Joscelyn Sur., A-69. IP 182 BOPD, 13/64-in., 38.7°, casing perforations 8,510-14 ft. TD 8,779 ft. (New field.)

Sohio Petroleum Co. 1-B B. E. Quinn, Jr., James Humphrey Sur., A-212. Dry. TD 7,476 ft.

Live Oak County: J. S. Abercrombie 1 Perkins, A. Fernandez Sur., A-179. Dry. TD 3,993 ft.

George S. Hammonds 1 Dugger, R. Everett Sur., A-7. Dry. TD 2,010 ft.

Matagorda County: Gardner-Cypress Mines Corp. 1 Krebs et al., I&GGN Sur. 9, Block 8, A-287. Dry. TD 9,013 ft.

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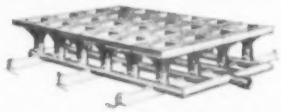
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WILDCAT COMPLETIONS

Orange County: Ed R. Bennett 1 L. H. Harmon-Gulf fee, William Dyson Sur. IP 185 BOPD, 9/64-in., 31.2°, basal Frio 6,552-58 ft. (casing perforations), 83 BOPD, 8/64-in., 32.6°, Frio 5,666-74 ft. (casing perforations), dual completion, TD 6,804 ft. (New pay in Orange field.)

Gulf Coast Leaseholds, Inc., 1 Lutcher-Moore, George A. Patillo Sur., A-20, Dry, TD 10,678 ft.

Sun Oil Co. 1 Linscomb et al., James Dyson Sur. IP 124.10 BOPD, 7/64-in., 34.7°, lower Hackberry 8,468-84 ft. (casing perforations), TD 10,000 ft. (Extends and new pay in Orange field.)

Victoria County: Horace Coon, Jr., and John B. Coffee 1 Kobitz, Jose Maria Hernandez Sur., A-59, Dry, TD 4,478 ft.

Wharton County: Caroline Hunt Sands 1 Polasek et al., BBB&C Sur., A-80, IP 47,000 M.c.f. daily, open flow, and 2½ BC per M.M.c.f., casing perforations 5,532-37 ft. TD 6,205 ft.

WEST CENTRAL TEXAS

Brown County: T. J. Burgess 1 C. S. Mathews, Sec. 9, HT&B, Dry, TD 1,370 ft.

Callahan County: Ralph and J. M. Hooks 2 Hooks estate, Blk. 2, T. J. Austin Sur. IP 126 BOPD, 6/64-in., pay sand 1,694-1,704 ft. TD 1,735 ft.

Coleman County: Anzac Oil Corp. 1 Sealy & Smith, 11-2-GH&H, IP 104 BOPD, ¾-in., 44°, pay 2,424 ft. TD 2,437 ft.

Coronet Oil Co. 66-1 J. P. Morris estate, 66-2-GH&H, Dry, TD 3,060 ft.

Moore & Gilmore 1 L. S. West, Sec. 40, BBB&C Sur. Dry, TD 3,172 ft.

Murray Petroleum Co. 1 James T. Padgitt, Brazoria CSL, Sur. 226, Dry, TD 3,632 ft.

Stroube & Stroube 1 J. E. Pauley, 33-1-GH&H, Dry, TD 3,364 ft.

W. J. Weaver Trustee 1 L. W. Bozemen, 710-2-James H. Grimes Sur. Dry, TD 2,697 ft.

Yeatman Drilling Co. 1 Oscar Beck, 105-1-GH&H, Dry, TD 3,433 ft.

Eastland County: K. L. B. Drilling Corp. 1 F. E. Clark, 82-3-H&TC, IP 4,700 M.f.g., Lake sand pay 3,213 ft. TD 3,860 ft., elev. 1,623 ft.

Fisher County: American Liberty Oil Co. et al 1-A Adrian, T. J. Morgan Sur. 233, Dry, TD 6,207 ft.

Claude E. Heard et al 2 Bert Rushing, 75-1-H&TC, IP 144 BOPD, 18/64-in., 42°, pay 5,258 ft. TD 5,278 ft., elev. 2,010 ft.

Lloyd H. Smith, Inc. 1 H. B. Byrd, 111-2-H&TC, Dry, TD 6,134 ft.

Jones County: Andree Drilling Co. et al 1 J. E. Manly, 2-14-T&P, Dry, TD 4,796 ft., Bend conglomerate 4,725 ft.

W. E. Butler 1 C. A. Williams, Sec. 205, BBB&C Sur. Dry, TD 3,200 ft.

Sid Katz Exploration Co. 1 F. L. Adamson, 99-1-BBB&C, Dry, TD 4,605 ft.

Rancho Oil Co. 2 City of Hamlin, Rodriquez Sur. 257, Dry, TD 5,815 ft.

Palo Pinto County: Wesley Stephens 1 J. J. Ragle, TE&L Sur. Sec. 1,771, Dry, TD 2,199 ft.

Shackelford County: West Central Drilling Co. 1 Hendrick, Sec. 101, ETRR Sur. Dry, TD 1,543 ft.

Stonewall County: Lamar Hunt Trust 1 Buelah Branch, 322-2-H&TC, Dry, TD 6,503 ft., elev. 1,903 ft., Caddo 6,435 ft.

Seaboard Oil Co. 1-D Upshaw, 83-D-H&TC, Dry, TD 6,225 ft.

Taylor County: Geochemical Surveys 2 J. B. Crain, League 148, Grimes CSL, Dry, TD 2,653 ft.

Throckmorton County: Cosden Petroleum Corp. 1 Hunt Ranch, Colorado CSL, Dry, TD 5,524 ft., Mississippian 5,420 ft.

WEST TEXAS

Crane County: Gulf Oil Corp. 1 P. J. Lea, 40-32-PSL, IP 1,254 BOPD, ¾-in., 41°, Ellenburger 8,165 ft. TD 8,448 ft., elev. 2,508 ft.

Gulf 1 EH State, 9-30-University Lands, IP 356 BOPD, ½-in., 48°, Ellenburger 11,908 ft. TD 12,012 ft., elev. 2,665 ft.

Crosby County: Texas Gulf Producing Co. 1 Hinson, 83-2-H&GN, 2 miles E. Kalgary, Dry, TD 8,380 ft., elev. 2,488 ft. Canyon reef 7,315 ft., Clear Fork 8,240 ft., granite wash 8,380 ft.

Ector County: British American Oil Producing Co. 1 Millard Eidson, 26-45-T2S-T&P, IPP 96 BOPD, 40°, Pennsylvanian 7,930 ft., elev. 2,983 ft.

Garza County: Duncan Drilling Co. 1 Kuykendall, 1421-347-T&P, Dry, TD 3,810 ft.

George J. Creer 1 L. G. Thuett, 1314-704-H&OB, Dry, TD 4,515 ft.

Union Oil Co. of California 1-E Post Estate, 31-4-K, Aycock Sur. Dry, TD 3,516 ft.

Kent County: Ned C. Butler 1 B. Wallace, 61-4-H&GN, Dry, TD 1,500 ft.

Robert K. Gilbert 12-1 G. T. Hall, Sec. 1, John Rodman Sur. Dry, TD 7,091 ft., elev. 2,135 ft., Canyon 6,600 ft., Simpson 6,095 ft.

Sunray Oil Corp. 1-52 W. A. Mays, 52-4-H&GN, Dry, TD 1,411 ft.

Sunray 1-53 Mays, 53-4-H&GN, Dry, TD 1,500 ft.

Tide Water Associated Oil Co. 1 Atkins Ranch, 73-G-Waco & Northwestern RR Sur. Dry, TD 7,439 ft., elev. 2,255 ft., Strawn 7,124 ft., Mississippian 7,401 ft.

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WILDCAT COMPLETIONS

Lubbock County: Concho Petroleum Co. 1 Clara Hayes, 50-5-GC&SF. Dry. TD 4,508 ft.

Pecos County: Brown & Thorp Drilling Co. et al 1-F Sullivan, 98-11-H&GN. IPP 115 BOPD, 39°, pay 4,018 ft.

H. R. Hamilton 1 Seale, 44-11-H&GN. Dry. TD 3,100 ft.

G. L. Hay, Trustee 1 Alexander, 85-10-H&GN. Dry. TD 6,330 ft., elev. 2,411 ft., Ellenburger 6,058 ft., by samples.

Phillips Petroleum Co. 1-C Puckett, 42-101-TCRR. IP 3,640 M.f.g., 12/64-in., flowing tubing pressure 4,366 psi., calculated open flow 47,000 M.f.g., Ellenburger pay 14,248 ft. TD 14,923 ft., elev. 3,330 ft. Extension to Glenna pool.

Reeves County: Hill & Hill and Emco Producing Co. 1 Hartford Accident & Indemnity Co., 50-4-H&GN. Dry. TD 4,543 ft., elev. 2,652 ft., Delaware lime 4,385 ft.

Runnels County: Thos. D. Humphrey & Sons 1 Bendina Deschamps, Blk. 9, Norselle Travis Sur. 533. Dry. TD 4,424 ft., elev. 1,717 ft., Ellenburger 4,412 ft.

Scurry County: F. T. Brahaney 1 R. H. Jordan, 667-97-H&TC. Dry. TD 3,512 ft.

Sutton County: Tennessee Production Co. 1 Alice L. Jones, 156-A-HE&WT. Dry. TD 7,800 ft., elev. 2,360 ft., reef 7,272 ft., Ellenburger 7,598 ft.

Tom Green County: Clark and Charless 1 E. H. Jones, Jung Sur. 888. Dry. TD 493 ft.

W. M. and A. P. Fuller 1 J. Willis Johnson, 1-A1224-H&TC. Dry. TD 6,400 ft., elev. 2,150 ft., Canyon 4,296 ft., Ellenburger 6,194 ft.

Harley Sadler and Travis Drilling Co. 1 Jones, Matia Josepha Fernades Sur. 100. Dry. TD 463 ft.

Ward County: Luce & Ice 1-A Brictson, 6-32-H&TC. IP 105,000 M.f.g., Devonian pay 6,697 ft. TD 6,886 ft. Extension to deep pay in Payton field.

ILLINOIS

Clark County: J. Bennett 1 Hurt, NW NE NE 6-9n-14w. Dry. TD 680 ft.

Clinton County: A. Achierman 1 Fehrman, NE SE SE 14-1n-4w. Dry. TD 2,530 ft.

W. H. Krohn 1 Hilgermann, NW NE SW 28-3n-3w. Dry. TD 1,309 ft.

E. White 1 Jones, SW SW SW 15-3n-3w. Dry. TD 1,132 ft.

H. J. Schlafly 1 Mahlandt, SW SW NW 30-3n-2w. Dry. TD 1,212 ft.

Fayette County: Paul Rossi 1 Payne, NE NE SE 15-4n-1w. Dry. TD 1,445 ft.

Richland County: Service Drilling Co. 1 Dunahee, NE NE NW 6-2n-14w. Dry. TD 3,225 ft.

St. Clair County: Homer Luttrell 1 Klein, NW SE NW 3-2n-6w. Dry. TD 2,419 ft.

White County: Vandenbark-McGuire 1 Flota, NE SW NE 35-6s-8e. Dry. TD 3,139 ft.

KENTUCKY

Daviess County: George S. Engle 1 Hundley, NW NW SE 1-P-27. Dry. TD 1,925 ft.

Hopkins County: F. B. Browning 2 Brown, NE SW SW 8-L-24. Dry. TD 3,400 ft.

Todd County: Carter Oil Co. 1 Teeter, NW SE SW 19-C-28. Dry. TD 1,581 ft.

INDIANA

Allen County: Webster-Shirk-Seibel 1 Harold, NW SW NW 36-30n-11e. Dry. TD 1,471 ft.

Dubois County: Ryan & Sharp 1 Barnett, SE NW NE 35-2s-6w. Dry. TD 1,190 ft.

Harry Miller 1 Eckstein, NW SE SE 34-1s-4w. Dry. TD 801 ft.

Spencer County: W. Sargent 1 Koetzel, NE SE NE 27-4s-5w. Dry. TD 1,182 ft.

Pool & Huff 1 Weyer, SE SW NE 3-4s-4w. Dry. TD 980 ft.

Sullivan County: Shulman Bros. 1 Bays, SW SW SW 8-9n-9w. Dry. TD 1,468 ft.

Vanderburgh County: George and Wrather 1 Ellis, NW SW NE 10-5s-10w. Dry. TD 1,001 ft.

Washington County: Tri-County Exploration Co. 1 Owsley, SE NE SW 10-3n-2e. Dry. TD 2,002 ft.

TENNESSEE

Fentress County: Poplar Cove area, Jerman & Witcher 1 Duncan, NE NE NW 17-1s-55e. Dry. TD 2,200 ft.

MICHIGAN

Allegan County: Cook Drilling Co. 1 Furjanich, NE SE NE 4-3n-13w. Dry. TD 1,671 ft. in Traverse.

Allegan County: Merrill Drilling Co. 1 Shank, NE NW NE 11-3n-14w. Dry. TD 1,678 ft. in Traverse.

Isabella County: Chartiers Oil Co. 1 Isabella Bank & Haggart, NW NE SE 11-15n-3w. Dry. TD 1,498 ft. in Marshall.

Jackson County: Allied Investments, Inc. 1 Harmon, NE SE NE 34-3s-3w. Dry. TD 1,590 ft. in Traverse.

Manistee County: Associated Drillers & Producers, Inc. 1 Grimes et ux, NE NE SW 22-24n-13w. Dry. TD 2,316 ft. in Dundee.

Missaukee County: States Oil Co. 1 Gray, C SW 32-23n-5w. 3.5 M.c.f. daily, Michigan Stray sand 986 ft. pay 986-91 ft. TD 991 ft. (New pool.)

Otsego County: Sun Oil Co. 1 Johannesburg Mfg. Co. Trustee, SE NW NW 10-30n-1w. Dry. TD 1,880 ft. in Traverse.

FLORIDA

Glades County: Coastal Petroleum Co. 1

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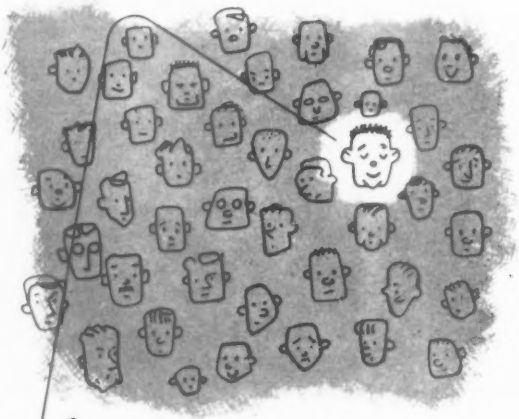

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WILDCAT COMPLETIONS

Internal-Tiedtka, 25-42s-33e. Junked hole. TD 13,424 ft.

ALABAMA

Clarke County: Sunnyland Contracting Co. 1 Cammack, 1-7n-3e. Dry. TD 5,271 ft. Elev. 209 ft., chalk 2,380 ft., Eutaw 3,580 ft., lower Tuscaloosa 4,856 ft.

Sterrett Proctor 1 Commack, C SW SW 32-7n-4e. Dry. TD 5,189 ft. Elev. 154 ft., chalk 2,570 ft., Eutaw 3,780 ft., marine Tuscaloosa 4,890 ft., Pilot sand 4,982 ft.

Pike County: R. W. Williams 2 Davis, 23-12n-21e. Dry. TD 1,450 ft.

Washington County: Daws-Stanley-Cashion 1 Loper, 12-4n-5w. Dry. TD 6,926 ft. Elev. 249 ft., Selma 5,127 ft., Eutaw 6,661 ft.

MISSISSIPPI

Clay County: Carter Oil Co. 1 McFadden et al, C NW SE 36-16s-5e. IP 580 M.c.f. daily and 2 BCPD, ¼-in., 59°, casing perforations 8,610-29 ft. TD 9,578 ft. Elev. 200 ft., Eutaw 255 ft., Tuscaloosa 387 ft., Mississippian 7,122 ft., Millerella 8,490 ft., Carter sand 8,644 ft., Sanders sand 8,820 ft., Lewis sand 9,326 ft., Devonian 9,550 ft. (New field-Siloam.)

Copiah County: R. R. Frankel 1 U.S.A., NE SW SW 34-10n-7e. Dry. TD 10,300 ft. Elev. 289 ft., Sparta 2,280 ft., Wilcox 3,614 ft., Chalk 7,968 ft., Eutaw 9,219 ft., Tuscaloosa 9,316 ft., lower Tuscaloosa 10,167 ft.

Jefferson County: R. A. Campbell 1 Reber, 6-8n-1e. Dry. TD 6,014 ft.

Jones County: Wallace R. Gunn and Crow Drilling Co. 1 Hill, C NE SW 25-9n-13w. Dry. TD 8,800 ft. Elev. 334 ft., Wilcox 2,204 ft., Chalk 5,283 ft., Eutaw 6,510 ft., marine Tuscaloosa 7,884 ft., lower Tuscaloosa 8,076 ft., lower Cretaceous 8,648 ft.

Madison County: D. C. Latimer and H. E. Richardson 1 Rogers-Raymond Unit, 31-7n-2e. Dry. TD 4,264 ft. Elev. 348 ft., Wilcox 1,897 ft., Eutaw 3,925 ft.

Marion County: Mobile Drilling Co. 1 McKenzie, 32-2n-14e. Dry. TD 9,550 ft. Elev. 129 ft., Sparta 2,596 ft., Wilcox 3,189 ft., Eutaw sand 8,119 ft., marine Tuscaloosa 8,575 ft., lower Tuscaloosa 8,950 ft., lower Cretaceous 9,502 ft.

Wilkinson County: Atlantic Refining Co. 1 Peterman et al, 17-3n-3w. Dry. TD 7,472 ft. Elev. 84 ft.

SOUTH LOUISIANA

Calcasieu Parish: Hunt Oil Co. 1 Ind. Labor Co., 36-8s-12w. Dry. TD 8,500 ft.

Evangeline Parish: Lamar Hunt Trust est. 1 Deville, 25-4s-2e. Dry. TD 10,530 ft.

Plaquemines Parish: Continental Oil Co. 1 State Lease 978, Blk. 53, West Delta Area. IP 103 BOPD, 8/64-in., 27°, casing perforations 6,370-88 ft. TD 8,350 ft. (New offshore field.)

Tide Water Associated Oil Co. 24-A Manhattan, 21-21s-30e. IP 129 BOPD, 14/64-in., 38°, casing perforations 14,662-72 ft. TD 15,520 ft. (New pay in Venice field.)

St. Martin Parish: The Texas Co. 24 St. Martin, 17-8s-7e. IP 90 BCPD and 5,165 M.c.f. daily, 13/64-in., 43°, casing perforations 11,400-15 ft. TD 11,431 ft. (New pay in Plumb Bob field.)

St. Mary Parish: California Co. 3 State Lease 2,044, 29-13s-10e. IP 310 M.c.f. daily, 9/64-in., casing perforations 2,378-86 ft. TD 10,981 ft. (New pay in Charenton field.)

The Texas Co. 1 State Lease 1819-Miami

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WILDCAT COMPLETIONS

Corp., 21-17s-12e. IP 312 BOPD, 14/64-in., 47°, casing perforations 13,272-76 ft. TD 13,915 ft. (New pay in Sweet Bay Lake field.)

NORTH LOUISIANA

Grant Parish: The Texas Co. 2 Urania Lumber Co. "B," C NW NE 23-7n-1e. Dry. TD 5,017 ft. Base Nebo 3,556 ft.

ARKANSAS

Cross County: Seaboard Oil Corp. "C" Core Hole, C SE SE SE NE 8-9n-2e. Dry. TD 2,121 ft.

Seaboard "D" Core Hole, C N½ NW 22-7n-2e. Dry. TD 2,647 ft.

Lafayette County: Burnett Producing Co. 1 Boyette "A," C SE NE SE 33-15s-24w. IPF 21 BOPD, Paluxy 2,810-16 ft. TD 5,230 ft. (Discovery tentatively called North Lewisville.)

Ouachita County: W. H. Bryant et al 1 Gaughan, 490 ft. S and 200 ft. W of C 2-14s-18w. Dry. TD 1,953 ft.

Poinsett County: Seaboard "B" Core Hole, C S½ SW SW 14-10n-2e. Dry. TD 2,106 ft.

Seaboard "A" Core Hole, C NW SE 19-10n-2e. Dry. TD 1,983 ft.

Woodruff County: Magnolia Petroleum Co. 5 Core Test, 360 ft. S and 782 ft. E NWc 32-9n-3w. Dry. TD 940 ft.

Magnolia 6 Core Test, 180 ft. S and 1,345 ft. E NWc 30-9n-3w. Dry. TD 812 ft.

OKLAHOMA

Bryan County: Sinclair Oil & Gas Co. 1 Anderson, SW NW NW 2-7s-9e. Dry. TD 4,050 ft. Arbuckle 3,340 ft.?

Cimarron County: Cities Service Oil Co. 1 Sparkman "A," SE SE NW 10-5n-9eCM. IPF 6,520 M.c.f. of gas per day, Keyes sand 4,620 ft. TD 4,810 ft. (Gas discovery.)

Comanche County: Jim Fish 1-A Peck, NW NE SW SW 11-2n-10w. Dry. TD 1,300 ft.

Garvin County: Cities Service 1 Radden, SE NW SW 22-3n-1w. Dry. TD 5,745 ft.

Kay County: Birmingham-Bartlett Drilling Co. 1 Peetoom, NW NW NW 30-28n-1w. Dry. TD 4,373 ft.

Lincoln County: W. J. Mitchell 1 Thompson, NE NE SW 32-13n-2e. IPP 15 BOPD, Skinner sand 5,064-70 ft., 35°, TD 5,080 ft. (Oil discovery.)

W. H. Martgan 1 Sutton, NE NW SW 35-13n-6e. Dry. TD 4,512 ft.

Ketchum-Whan Drilling Co. 1 Trimble, SW NW SE 27-16n-5e. Dry. TD 3,752 ft.

McCurtain County: Bill Petty et al 1 Johnson, C NW NW 30-7s-24e. Dry. TD 790 ft.

Oklahoma County: Seneca Oil Co. 1 Burton, SE SE SW 18-14n-1w. Dry. TD 6,142 ft.

Osage County: Bay Petroleum Corp. 1 Osage, NE NE NW 10-23n-6e. Dry. TD 3,047 ft.

Hanlon-Boyle, Inc. 1-A Osage, SW SW NE 5-28n-9e. IPF 96 BOPD, Peru sand 1,620-39 ft., 6/32-in. TD 1,639 ft. (Oil discovery.)

Pawnee County: Nadel & Gussman 1 Willard, SE SE NE 15-20n-5e. Dry. TD 3,635 ft.

Pontotoc County: W. A. Delaney, Jr. 1 Marcum, NW NW SW 23-2n-6e. Dry. TD 3,918 ft.

Phillip E. Kouri and Goforth 1 Moser, SE SE SW SW 19-3n-7e. Dry. TD 1,482 ft.

Okla-Tex Oil Corp. 1 Williams, NE NW NE 29-5n-4e. Dry. TD 2,937 ft.

Sequoyah County: Russell Cobb, Jr. 1 Haraway, SE SE SE 26-12n-22e. Dry. TD 2,134 ft. Arbuckle 1,785 ft.

Stephens County: Phillips Petroleum Co. 1 Chism, NE SE NW 2-1n-4w. IPF 130 BOPD, Penn. cong. 7,035-7,677 ft., 35.7°, 18/64-in. TD 10,866 ft. (Oil discovery.)

KANSAS

Butler County: The Texas Co. 1 Brown, NW NE SE 3-26s-6e. Dry. TD 2,778 ft.

J. P. Gaty 1 Wolfe, SE SE NE 10-27s-3e. Dry. TD 3,079 ft.

Kingman County: Southwest Exploration-Transit Corp. 1 Settle, SE SE SE 18-29s-7w. Dry. TD 4,645 ft.

Marion County: W. R. Wilson et al 1 Klassen, NE SE NW 32-21s-1e. Dry. TD 3,590 ft.

McPherson County: Anschutz 1 Fleming, SE SE NE 10-20s-4w. IPP 157 BOPD, Viola 3,728-38 ft. TD 3,802 ft. (Discovery Groveland pool.)

Norton County: Harry Gore 1 Walters, SW SW SE 36-4s-22w. Dry. TD 3,710 ft.

Pawnee County: Isern Drilling Co.-V. Nixon 1 Cook, NE NE SW 31-21s-16w. Dry. TD 3,993 ft.

Pickrell Drilling Co. 1 Curtis, SE SW NW 6-23s-15w. Dry. TD 4,160 ft.

Pratt County: Helmerich & Payne 1 Hertlein, SE SE NW 22-28s-13w. IPP 77 BOPD, Lansing-Kansas City 3,924-40 ft. TD 4,665 ft. (Oil discovery.)

Saline County: F. S. Williams-Mallard 1 Hanson, NE NW NE 2-14s-1w. Dry. TD 2,524 ft.

Sedgwick County: J. P. Gaty 1 Reeser, SW SW NE 10-28s-2e. Dry. TD 3,032 ft.

Stafford County: Natural Gas & Oil Co. 1 Holbrook, NW SE NE 5-23s-14w. Dry. TD 4,090 ft.

Welch & Olsson 1 Reid, SE NW SE 1-24s-15w. Dry. TD 4,130 ft.

El Dorado-Rock Island 1 Lyons, NE NE NW 17-25s-13w. Dry. TD 4,316 ft.

Trego County: Jones, Shelburne & Farmer 1 Mai, NW NW SE 21-13s-23w. Dry. TD 4,581 ft.

NEBRASKA

Chase County: Big Basin Oil Co. 1 Bennett, C NE NE 19-5n-41w. Dry. TD 3,900 ft. Morrison 3,465 ft.

Cheyenne County: Ryan Oil Co. 1 Schnell, SE SE NE 25-14n-49w. IPP 100 BOPD, "D" sand 4,379 ft. TD 4,440 ft. ("D" sand discovery, new field.)

Reco Oil Co. 1 Lyngholme, SE SW NE 24-14n-51w. Dry. TD 5,020 ft.

Ryan Oil Co. 1 Henneman, SE SE 31-16n-49w. Dry. TD 4,739 ft.

Deuel County: Sherrod & Apperson 1 Kontny, SW SW SW 10-13n-43w. IP 3,000 M.c.f. gas per day. TD 3,328 ft. ("D" sand discovery, new field.)

Frontier County: Victor Anderson 1 Herman, SE SE SE 9-6n-27w. Dry. TD 3,516 ft. Pre-Cambian 3,489 ft.

Gage County: W&M 1 Ryan, SW SW SW 27-3n-5e. Dry. TD 2,803 ft. Simpson 2,600 ft.

Kimball County: Eddie Fisher-Stout Oil Co. 1 Long, NE NE SW 21-13n-54w. Dry. TD 6,181 ft.

Nebraska Drillers, Inc. 1 Miles, NE SE NE 22-14n-56w. Dry. TD 6,614 ft.

Valley County: Shell Oil Co. 1 Valla, NW NW NE 6-19n-16w. Dry. TD 3,513 ft. Pre-Cambrian 3,506 ft.

SOUTH DAKOTA

Dewey County: Kerr-McGee Oil Industries 1 Wallace Cook, SW NW SW 32-13n-22e. Dry. TD 5,991 ft. Granite 5,960 ft.

NORTH DAKOTA

McKenzie County: Amerada Petroleum Corp. 1 Pittsley, C SE SE 15-151n-96w. Dry. TD 9,451 ft. Madison 9,047 ft.

Amerada 1 Morten Anderson, C SE SW 2-152n-96w. Dry. TD 9,078 ft. Madison 8,705 ft.

MONTANA

Daniels County: Socony-Vacuum, Pegasus Div. F-11-6 Rhodes, C NW NW 6-33n-47e. Dry. TD 3,975 ft. Winnipeg 9,326 ft.

Phillips County: Baysel Oil & Gas 1 Government, C Lot 4, Sec. 3-23n-24e. Dry. TD 3,835 ft. Madison 3,830 ft.

Roosevelt County: Wilcox 1 Moe, C NE SW 2-29n-52e. Dry. TD 7,635 ft. Madison 6,942 ft.

NEVADA

Elko County: Weston Osage Oil, Inc., 1 Government, NW NE SW 14-31n-69e. Dry. TD 1,025 ft. Temp. suspended.

WYOMING

Johnson County: Manning & Bay Petroleum Co. 1 Government, SW NE SW 19-43n-81w. Dry. TD 3,754 ft. Tensleep 3,732 ft.

COLORADO

Adams County: Ginther-Warren & Ginther 2 Noonan Ranch, SW SE NW 24-3s-59w. Dry. TD 7,510 ft.

Jackson County: Ryan Oil Co. 1 Government, C NE SW 19-10n-78w. Dry. TD 4,837 ft. Morrison 4,456 ft.

Morgan County: Tri-Mark Oil Co., J. C. Wynne and Ed Skeeters 1 Hector Cnockaert, SW SW SW 31-6n-56w. Dry. TD 6,015 ft.

Washington County: R. A. Goodall 1-18 Kejr-Jensen, SE NW NW 18-2s-56w. Dry. TD 5,450 ft.

Weld County: Helmerich & Payne, Inc. 1 Snyder, SW NW SE 34-8n-58w. Dry. TD 7,614 ft.

Novi Equipment Co. 1 Hoffman, NE NW SW 32-11n-62w. Dry. TD 7,891 ft.

Novi Equipment Co. 1 UPRR Waters, E½ SE NE 33-11n-62w. Dry. TD 7,825 ft.

ARIZONA

Navajo County: Texas-Sinclair-Skelly 1-A Navajo, NE NW 12-41n-18e. Dry. TD 4,523 ft. Devonian 4,060 ft.

NORTHWEST TERRITORIES

British-American-Hudson's Bay 1 Root River, 62° 26' N Latitude; 123° 16' 15" W Longitude. Dry. TD 2,778 ft.

SASKATCHEWAN

Imperial-Tide Water 4-1-9-16 Admiral, LSD 4, 1-9-16w3. Dry. TD 4,840 ft.

Socony-Woodley-Southern 13-5 Beverly, LSD 5, 13-15-16w3. Dry. TD 3,700 ft.

Tide Water-Glenbain 1 Crown, LSD 8, 22-10-8w3. Dry. TD 5,422 ft.

Amurex-Albercan-Allenbee-Keno 1-12 Smith, LSD 12, 31-13-25w3. Dry. TD 3,490 ft.

Shell Oil Co. 2 Omega, LSD 15, 22-7-19w2. Dry. TD 4,860 ft.

British - American - Husky - Phillips 1 Montmarte, LSD 12, 11-15-11w2. Dry. TD 4,325 ft.

ALBERTA

Delhi-Banff 1 Acme, LSD 13, 22-29-25w4. D3 Devonian oil well. TD 7,203 ft.

Imperial 6-8 Calmette, LSD 6, 8-58-25w4. Dry. TD 2,825 ft.

Sturgeon-Merrill-Mill City 1 New Davies, LSD 5, 16-1-13w4. Dry. TD 2,610 ft.

Texaco 1-B Enchant, LSD 13, 19-13-16w4. Mississippian gas strike. TD 3,630 ft.

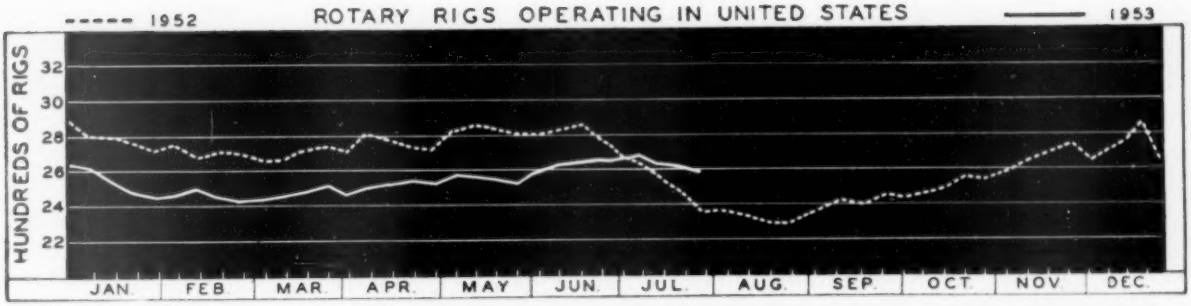
Homestead-Calvan 8-15 Hamilton Lake, LSD 8, 15-35-10w4. Dry. TD 5,869 ft.

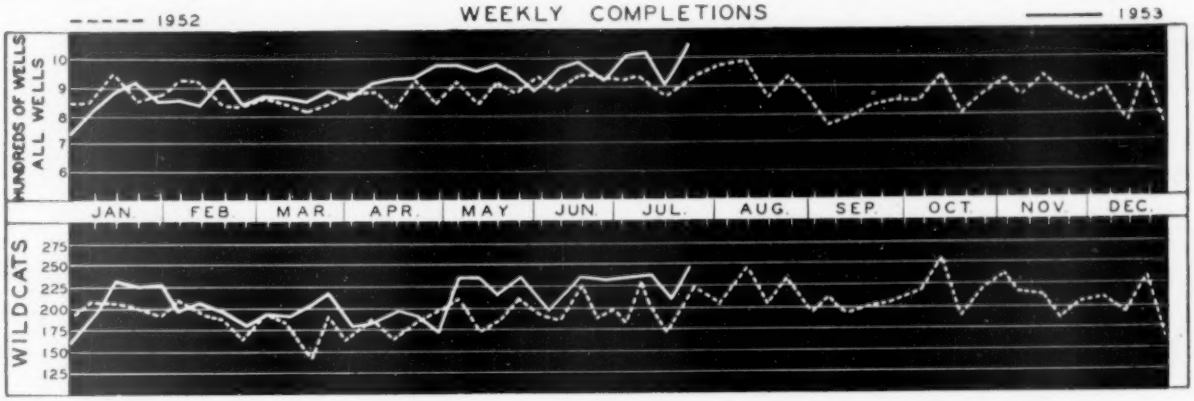
Anglo-Socony 31-4 Hesketh, LSD 4, 31-28-21w4. Dry. TD 6,330 ft.

Mill City 1 Grade, LSD 7, 11-57-7w4. Dry. TD 1,585 ft.

Seaboard-Canadian Superior 11-30 East Stettler, LSD 11, 39-40-17w4. Dry. TD 5,300 ft.

N. U. L.-Calvan-Merrill 7-12 Tofield, LSD 7, 12-50-19w4. Dry. TD 3,331 ft.





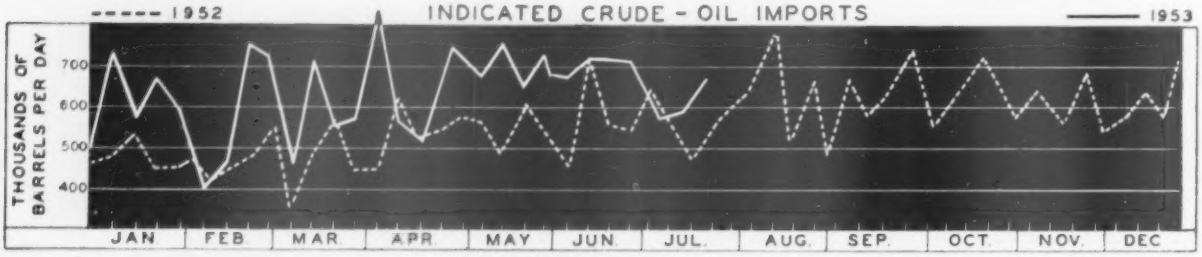
CURRENT STATISTICS

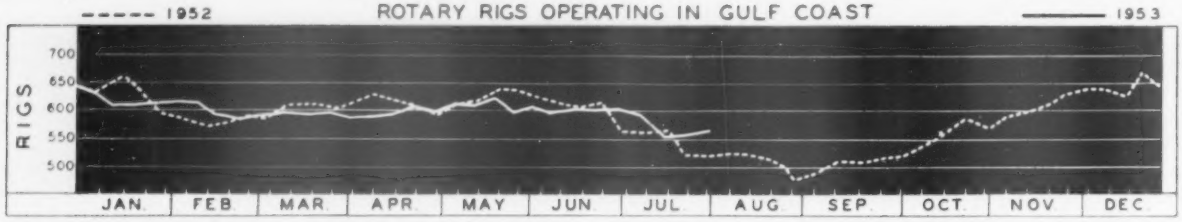
EXPLORATION

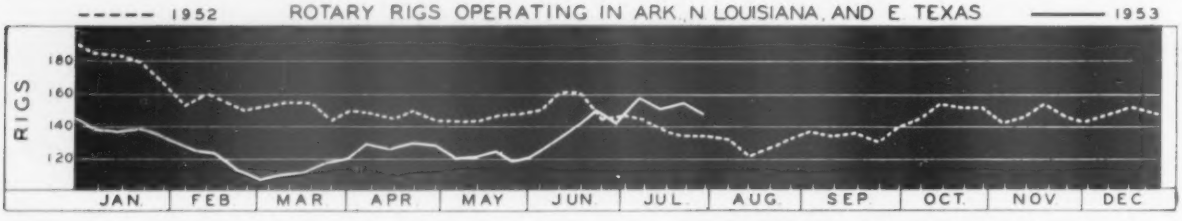
WEEKLY WELL COMPLETIONS . . .WEEK ENDED JULY 25, 1953

	Total of all wells					July 25		Wildcat completions and discoveries					Cumulative total, 1953				
	Comp.	Oil	Gas	Dry	Footage	1953	1952	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	16	8	0	*8	23,700	396	450	0	0	0	0	0	0	0	0	0	0
Pennsylvania	42	22	6	†14	70,000	972	1,053	0	0	0	0	0	0	0	3	11	14
West Virginia	16	1	10	5	40,148	345	340	0	0	0	0	0	0	0	5	3	8
Ohio	18	7	3	‡8	35,961	566	578	0	0	0	0	0	2	0	1	10	13
Indiana	27	9	0	18	41,427	704	679	0	0	0	8	8	9	0	2	182	193
Kentucky	21	9	0	12	41,513	595	743	0	0	0	3	3	6	0	1	106	113
Illinois	52	29	0	23	123,030	1,026	1,048	0	0	0	9	9	4	0	0	222	226
Michigan	15	4	1	10	31,047	323	394	0	0	1	6	7	10	0	5	128	143
Kansas	104	46	8	§50	346,724	2,763	2,681	2	0	0	13	15	62	0	22	428	512
Nebraska	11	2	1	8	50,425	189	138	1	0	1	8	10	13	0	3	83	99
Oklahoma	158	98	7	‡53	543,504	4,062	3,271	3	0	1	14	18	66	5	20	367	458
Texas	370	192	28	150	1,800,707	9,740	10,368	14	2	5	97	118	499	36	108	2,367	3,010
North Central (Dist. 7-B & 9)	137	78	2	57	455,627	3,651	3,276	4	0	1	32	37	259	0	11	970	1,240
West (Dist. 7-C & 8)	78	50	3	25	430,979	2,111	3,234	4	0	2	19	25	103	2	10	374	489
Panhandle (Dist. 10)	13	6	4	3	40,017	451	390	0	0	0	0	0	0	2	0	15	17
Eastern (Dist. 5 & 6)	20	7	5	8	117,278	454	525	0	0	0	7	7	13	2	4	155	174
Gulf Coast (Dist. 2 & 3)	57	27	6	24	401,525	1,441	1,524	4	2	1	14	21	64	13	44	368	489
Southwest (Dist. 1 & 4)	65	24	8	33	355,281	1,632	1,419	2	0	1	25	28	60	17	39	485	601
Louisiana	40	21	2	17	250,062	1,438	1,297	3	1	1	3	8	44	21	14	194	273
Northern	20	10	1	9	66,247	574	684	0	0	0	1	1	5	1	2	67	75
Southern	20	11	1	8	184,355	864	613	3	1	1	2	7	39	20	12	127	198
Arkansas	17	8	0	9	49,703	266	216	1	0	0	7	8	7	0	0	65	72
Mississippi	12	5	0	7	86,760	210	203	0	1	0	6	7	9	1	3	102	115
Southeastern States	4	0	0	4	30,810	82	36	0	0	0	4	4	1	0	0	66	67
Montana	6	0	0	6	30,189	218	144	0	0	0	3	3	5	0	0	58	63
Wyoming	17	12	1	4	75,382	370	381	0	0	0	1	1	11	0	0	66	77
Colorado	15	2	3	10	79,998	327	244	0	0	0	7	7	15	0	9	153	177
Utah	0	0	0	0	0	41	36	0	0	0	0	0	2	0	2	24	28
New Mexico	11	2	8	1	58,788	730	585	0	0	0	0	0	10	0	7	66	83
California	60	41	3	16	295,688	1,443	1,407	2	0	1	13	16	35	0	5	322	362
North Dakota	7	5	0	2	60,533	144	33	0	0	0	2	2	7	0	0	29	36
Misc. (Tenn., S. D., Ariz., Nev.)	6	2	0	4	15,909	36	46	0	0	0	4	4	1	0	1	28	30
Total United States	1,045	525	81	439	4,182,548	26,986	26,371	26	4	10	208	248	818	63	211	5,080	6,172
Total previous week	901	483	60	358	3,628,233			26	1	3	180	210	792	59	201	4,872	5,924
Total July 26, 1952	936	481	66	389	3,882,521			31	1	5	184	221	795	52	144	4,695	5,686

Service wells included: *8, †12, ‡2, §1.



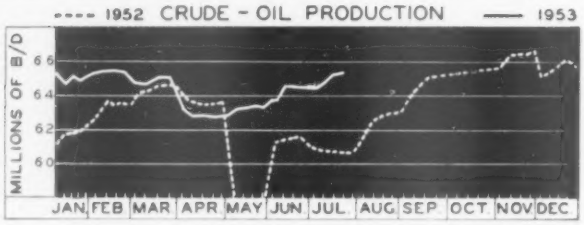


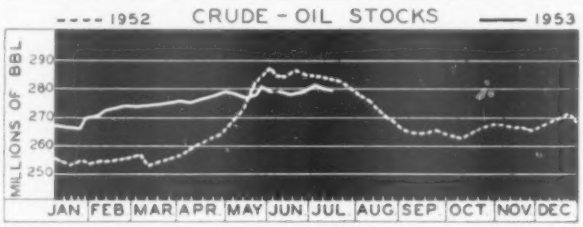


DAILY AVERAGE PRODUCTION FOR WEEK

	July 25 Crude oil	July 25 Lease condensate	July 25 Total	July 18 total
Alabama	5,100		5,100	5,000
Arkansas	76,300	500	76,800	76,100
California	1,015,400		1,015,400	1,014,600
Colorado	107,400		107,400	106,300
Eastern	59,200		59,200	59,200
Florida	1,550		1,550	1,550
Illinois	157,100		157,100	157,700
Indiana	34,600		34,600	34,300
Kansas	340,800		340,800	339,400
Kentucky	30,400		30,400	30,600
Louisiana	671,350	40,400	711,750	710,300
North	105,700	2,400	108,100	106,650
South	565,650	38,000	603,650	603,650
Michigan	33,500		33,500	33,000
Mississippi	92,500	3,400	95,900	97,600
Montana	30,500		30,500	31,000
Nebraska	14,000		14,000	13,800
New Mexico	196,900	850	197,750	197,850
Oklahoma	547,400		547,400	538,200
Texas	2,805,625	44,800	2,850,425	2,850,425
Dist. 1	38,150	300	38,450	38,450
Dist. 2	155,350	6,000	161,350	161,350
Dist. 3	453,400	22,200	475,600	475,600
Dist. 4	266,000	6,000	272,000	272,000
Dist. 5	49,650	350	50,000	50,000
Dist. 6	126,200	5,050	131,250	131,250
East Texas field	247,500		247,500	247,500
Dist. 7-B	117,800	50	117,850	117,850
Dist. 7-C	162,050	4,000	166,050	166,050
Dist. 8	928,525	400	928,925	928,925
Dist. 9	184,500	400	184,900	184,900
Dist. 10	76,500	50	76,550	76,550
Utah	5,300		5,300	5,200
Wyoming	210,300		210,300	210,000
North Dakota	14,200		14,200	14,500
Total U. S.	6,449,425	89,950	6,539,375	6,526,625
Change from previous week, up			12,750	
Canada	285,000		285,000	276,500
Total U. S. production January 1-July 25			1,325,929,925 bbl.	
Same period last year (crude plus cond.)			*1,264,621,975 bbl.	

*Includes 18,283,685 bbl. condensate.



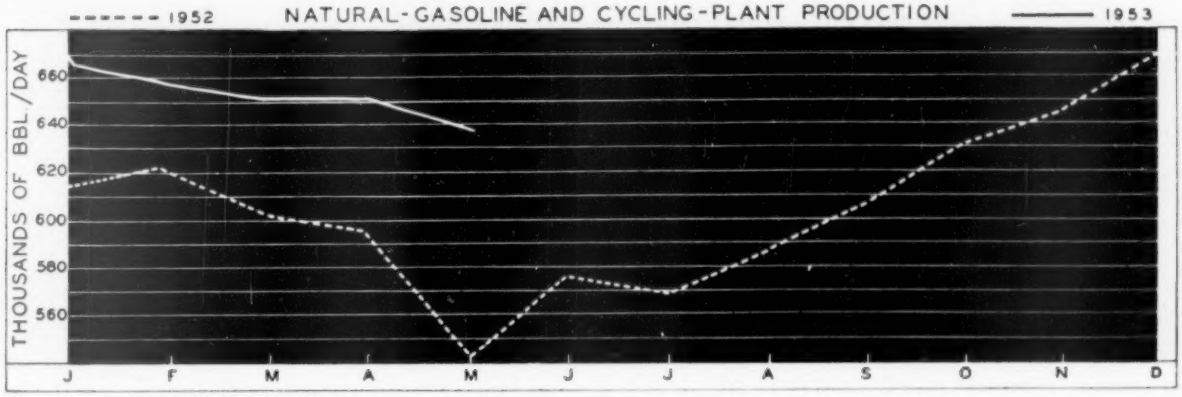


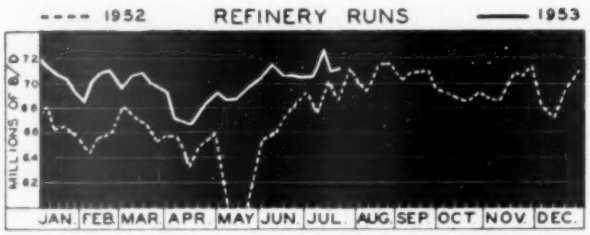
CRUDE-OIL STOCKS BY STATES OF ORIGIN*

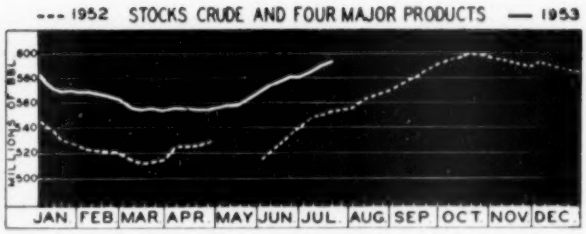
(Thousands of barrels)

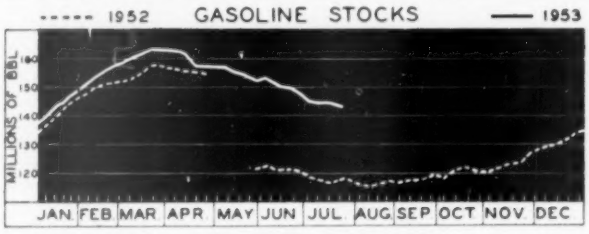
	July 18, '53	July 11, '53	July 19, '52
Pennsylvania Grade	2,549	2,563	2,320
Other Appalachian	2,054	2,104	2,079
Illinois, Indiana, Michigan	12,130	12,314	12,881
Arkansas	2,802	2,836	2,908
Louisiana	15,414	15,773	15,408
North	2,450	2,513	2,478
Gulf	12,964	13,260	12,930
Mississippi	3,724	3,748	3,323
New Mexico	7,109	7,136	8,033
Oklahoma and Kansas	39,099	39,545	42,451
Texas	134,147	133,340	138,902
East Texas	11,057	11,197	13,470
West Texas	63,195	61,794	61,208
Texas Gulf	26,383	26,054	30,022
Other Texas	33,512	34,295	34,202
Rocky Mountain	17,133	16,933	14,982
California	33,528	33,537	30,863
Foreign	9,940	9,984	8,065
Total	279,629	279,813	282,215

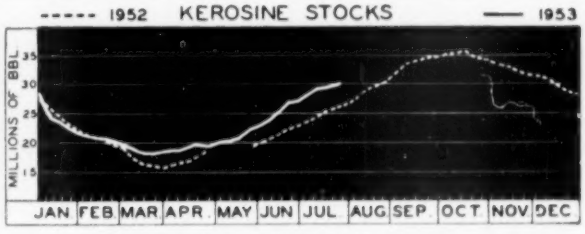
*Bureau of Mines. ‡Includes 2,456,000 bbl. in California.

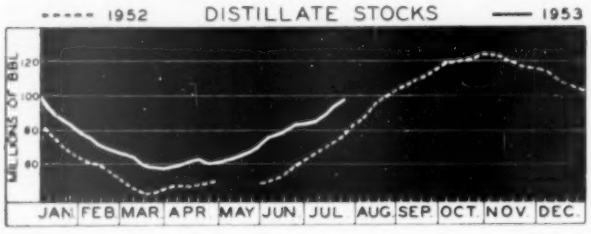


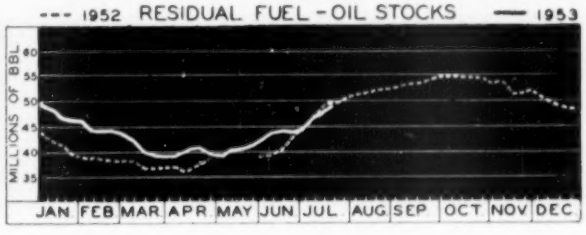










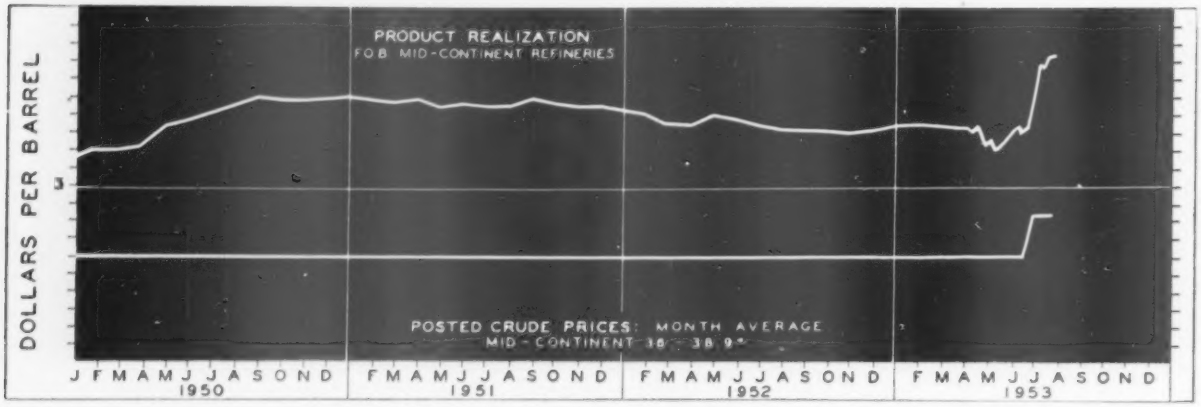


A.P.I. REFINERY REPORT, JULY 25

(Thousands of barrels)

District—	Daily avg. runs	Daily average production Gaso.*	Kero.	Dist.	Resid.	Stocks† Gaso.‡	Kero.	Dist.	Resid.	Bureau of Mines, July 1952 Daily avg. runs	Daily average production Gaso.*	Kero.	Dist.	Resid.
East Coast	1,094	453.0	35.4	273.0	239.6	34,111	12,398	32,627	12,382	1,056	416.2	46.3	234.4	235.0
Appalachian:														
District 1	107	47.0	5.7	15.6	12.7	3,363	559	986	671	105	45.5	4.9	14.9	11.4
District 2	95	50.9	7.7	8.7	15.3	1,477	417	554	158	81	42.0	2.8	14.3	10.7
Ind., Ill., Ky.	1,300	695.4	63.4	219.0	156.4	28,262	6,804	16,158	4,148	1,300	691.4	72.1	238.9	150.5
Okla., Kans., Mo.	636	368.7	21.2	148.6	54.6	14,683	2,100	10,556	1,269	610	343.9	15.2	142.8	58.3
Inland Texas	273	184.6	12.7	51.3	36.6	5,959	553	1,776	1,501	273	188.0	13.1	44.6	40.9
Texas Gulf Coast	1,631	833.6	107.6	368.8	239.0	19,492	3,649	14,162	7,252	1,648	743.9	138.7	412.8	265.0
La. Gulf Coast	593	299.8	44.4	136.9	71.8	7,570	2,603	6,276	1,672	531	232.8	48.4	148.1	51.7
N. La. and Ark.	85	33.9	7.9	25.0	9.3	3,038	549	859	123	77	31.9	5.8	18.6	6.1
Rocky Mountain:														
New Mexico	19	12.3		2.9	3.7	188		39	29	20	12.4	0.4	2.9	4.1
Other Rocky Mtn.	260	122.0	3.1	62.1	39.6	5,591	269	2,232	938	241	112.4	3.5	46.4	41.8
California	1,032	463.7	6.9	120.0	375.4	19,712	411	11,889	18,743	985	434.2	6.3	156.6	361.2
July 25, 1953	7,125	3,564.9	316.0	1,431.9	1,254.0	143,446	30,312	98,114	48,886	6,927	3,294.6	357.5	1,475.3	1,236.7
July 18, 1953	7,088	3,498.3	322.4	1,534.2	1,254.0	143,820	29,644	94,912	47,779					
July 26, 1952	7,108	3,344.7	367.9	1,462.4	1,253.7	118,285	26,029	81,792	51,152					

*At refineries including natural blended. †Finished and unfinished. ‡At refineries, bulk terminals, in transit, and in pipe lines.


PRODUCT REALIZATION
F.O.B. MID-CONTINENT REFINERIES
DOLLARS PER BARREL
3
POSTED CRUDE PRICES: MONTH AVERAGE
MID-CONTINENT 38° - 38.9°
J F M A M J J A S O N D
1950
F M A M J J A S O N D
1951
F M A M J J A S O N D
1952
F M A M J J A S O N D
1953

In this trend chart refinery realization is based on average Mid-Continent grade crude oil (not 38° gravity only) and average prices for refinery products as published in The Oil and Gas Journal basis Oklahoma (Group 3). Refinery yields confined to gasoline, kerosine, distillate and fuel oil. Realization averaged $3.76 for week ended July 18, $3.74 for previous week, and $3.36 for July 1952. The above trend information is based on volumes and current prices and therefore does not reflect changes in operating costs.

REPRESENTATIVE QUOTATIONS

Representative spot-market quotations of leading suppliers as of July 29, 1953. Figures are f.o.b. plant for tank-car shipments in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge)	Texas Gulf Coast
Regular gasoline	11¾-11⅞	13.25-13.8	11.25-11.75
Premium gasoline	12⅜-12⅞	14.5-14.8	12.5-12.75
42-44 w.w. kerosine	8.875-9.25	10.15-10.4	9.5
No. 2 straw fuel oil	7.875-8.25	9-9.4	8.375-8.5
No. 6 residual	$1.05-1.20	$2.15-2.40	$1.75-1.90

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	5½	5	5¼
Grade 18-55	6.60	6.10	6.35

LUBRICATING OILS

South Texas

200 vis., No. 2-3 neutral	13.75
750 vis., No. 3-4 neutral	16.75
2,000 No. 5-6 neutral	18.5-18.75

LUBRICATING OILS

Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	22-22.5
200 vis., No. 3 neutral, 0-10 pp.	15-15.5

Western Pennsylvania

145-155 vis., 10 p.t. bright stock	25.5
180 vis., 10 p.t. neutral	27.5

WAX

Mid-Continent

132-134 A.M.P.	6.0

GOOD motoring weather over most of the nation is again pushing gasoline demand to the high levels that most refiners had set for this summer. Movement of gasoline out of most pipe-line and water terminals has been generally satisfactory for the last half of July, but there were a few reported cases in the slack period following the July 4 week end where suppliers were caught with too much material at certain pipe-line terminals and had to move some of the gasoline at under-the-market prices or pay demurrage.

Refinery production of gasoline set a new record for the week ended July 11, and the output for the week ended July 18 had been exceeded in only three other weeks. However, indicated demand for the weeks was low, and stocks decreased only 677,000 bbl. for the 2-week period. Normal stock reduction for the period would have been 2,500,000 or 3,000,000 bbl.

Distillate stocks for the country as a whole increased at the rate of 617,000 bbl. daily for the 2-week period ended July 18. These additions to primary storage represented 41 per cent of total distillate production. The lack of summer sales for secondary and consumer storage is tending to flood primary storage and to produce even softer spot markets.

Some No. 2 fuel is reported available in New York Harbor at slightly under 9 cents a gallon. Top quotation for No. 2 is 9.4 cents net, but spot sales are not made at this price.

The further softening of light-fuel markets on the East Coast is causing some easing of prices on the Gulf Coast. Some No. 2 fuel is reported to be available at the normal price of 8.5 cents but with the seller storing the material for periods up to 4 months. Since there is no storage relief from a sale under this plan, the sellers must expect prices to stay near current levels until the first of December.

CRUDE PRICES GRAVITY SCHEDULE

	Signal Hill, Calif.*	Okla-homa, Kansas	Gulf Coast Tex.†	West Tex.‡
14-14.9	$1.87			
15-15.9	1.93			
16-16.9	1.99			
17-17.9	2.05			
18-18.9	2.11			
19-19.9	2.18			
20-20.9	2.24	$2.50		$2.37
21-21.9	2.30	2.52		2.39
22-22.9	2.37	2.54		2.41
23-23.9	2.45	2.56		2.43
24-24.9	2.53	2.58	$2.91	2.45
25-25.9	2.61	2.60	2.93	2.47
26-26.9	2.69	2.62	2.95	2.49
27-27.9	2.76	2.64	2.97	2.51
28-28.9	2.83	2.66	2.99	2.53
29-29.9	2.91	2.68	3.01	2.55
30-30.9	2.97	2.70	3.03	2.57
31-31.9	3.04	2.72	3.05	2.59
32-32.9	3.12	2.74	3.07	2.61
33-33.9		2.76	3.09	2.63
34-34.9		2.78	3.11	2.65
35-35.9		2.80	3.13	2.67
36-36.9		2.82	3.15	2.69
37-37.9		2.84	3.17	2.71
38-38.9		2.86	3.19	2.73
39-39.9		2.88	3.21	2.75
40 and above		2.90	3.23	2.77

*Standard Oil Co. of California. †Upper Texas Gulf Coast. ‡Includes New Mexico Permian.

Prices East of California effective June 15, 1953. California prices effective February 16, 1953.

FLAT CRUDE PRICES

Representative posted schedules per barrel.

Louisiana:	
Cotton Valley (distillate)	$3.00
Cotton Valley (Holloway crude)	2.95
Texas:	
East Texas	2.90
Chapel Hill	2.83
Conroe	3.13
Van	2.73
Pennsylvania Grade:	
Bradford	4.40
Southwest Pennsylvania	3.97
West Virginia	3.91
Illinois Basin	3.02

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EQUIPMENT FOR SALE

FOR SALE: 10,000′—4½″ drill pipe, with tool joints cut off, located at Hobbs, New Mexico. Makin Drilling Company, Box 1628, Hobbs, New Mexico.

FOR SALE: Three large complete power drilling rigs for estate of Al Buchanan Drilling Co. Contact Turner Briggs, Phone Monroe 5-6000, Houston, Texas.

WICHITA Falls Spudder Model 61, Le Roi engine, butane equipped. Will drill to depth 5,000′, cleanout work to 6,500′. Tools from 10″ to 5″. Includes assortment of stems, bailers, spiral and regular bits, Swann underreamers, and Wilson elevators. All types of fishing tools. New Kohler light plant, steel tool house. Complete in every respect. Rig good as new. Priced reasonable. Inventory furnished upon request. Write or call George Proctor, Phone 2-6663, 307 City National Building, Wichita Falls, Texas.

FOR SALE: Complete Rig now operating Cardwell Model D. Drawworks, GM 6 Power, 6x16 pump, oil well table, 2 dog houses, trailer house, welding equipment. Inventory on request. Post Office Box 403, Phone 4-2081, Wichita, Kansas.

AIR ELIMINATORS AND AUTOMATIC LINE SHUT OFF VALVES

These devices will solve your problems or your money back. Write for detailed information and installation instructions.

McCUNNINGHAM MFG. CO.
P. O. Box 476
Sedan, Kansas

EQUIPMENT FOR SALE

ROTARY RIG. Late Model Bethlehem, Air Controls, complete with 10,000′ drill pipe, now running on 10,000′ well. Will sell or take 3500′ rig in trade. P. O. Box 2574 or telephone 4-4222, Tulsa, Oklahoma.

FOR SALE: 60,000 4½ o.d. s.s. line, 60,000 3½ o.d. line all new. 5—55,000 bbl. tanks. 5—10,000 and 5—5,000 tanks. Lundquist Pipe & Supply Co. Phone 5-8850, Tulsa, Okla. P. O. Box 1215.

SALES and rentals of cable drilling and fishing tools, casing and equipment, from the Southwest's largest stock of used cable tools and oil field supplies. Degen Pipe and Supply Co., Tulsa, Oklahoma.

USED LINE PIPE FOR SALE

17 miles 10¾″ OD Electric Weld 28.04# PE BFW. Approx. length 37′. 51 miles 8⅝″ OD Seamless 23.57# PE BFW. Approx. length 35′. 10 miles 6⅝″ OD Seamless 17.02# PE BFW. Approx. length 35′. We consider the above first-class merchandise.

BETHLEHEM SUPPLY CO.
Box 2171, Tulsa, Oklahoma
PHONE 5-9261, Ext. 361

EQUIPMENT FOR SALE

FOR SALE: NEW 4½″ OD 16.60# Grade "D" Youngstown External Upset Drill Pipe Threaded for Hughes Seal Grip Tool Joints: 4036′—$229.54 C Ft. our Great Bend, Kansas, Yard. 4043′—$228.84 C Ft. our Chase, Kansas, Yard. NEW 4½″ OD 16.60# Grade "D" External Upset Youngstown Drill Pipe Threaded API. 4034′—198.18 C Ft. our El Dorado, Kansas, Yard. All subject to prior sale. Buckeye Supply Co., Phone 20, El Dorado, Kansas.

FOR SALE

To settle the Estate of J. M. Cline, Deceased. NATIONAL 50 RIG with 7¼ x 14 OIL WELL PUMP. Two 1879 BUDA ENGINES, NEW LEE C. MOORE DERRICK, 94 ft. 3500 ft. 4½ NEW DRILL PIPE WITH 3 PIPE BASKETS. TOOL HOUSE, WATER TANK, TOOL BOX, LIGHT PLANT, two WATER PUMPS, OIL WELL ROTARY TABLE AND SWIVEL. Everything in good shape, ready to go, rig is in Mt. Carmel, Illinois. For more details call or write

DALLAS CLINE
815 Walnut St., Mt. Carmel, Ill.
DALLAS and P. M. CLINE,
Administrators

FOR SALE

PIPE-LINE PUMPING EQUIPMENT

7 Complete Diesel Stations:

25,000 to 50,000 barrels per day; reciprocating power pumps and diesel oil engines ranging from 500 to 800 h.p. in both vertical and horizontal type; and all auxiliary equipment in connection therewith.

6 Complete Steam Stations:

40,000 to 50,000 barrels per day with 250 h.p. Babcock & Wilcox water tube brick furnace boilers with steam pumps and triple pumping engines.

All above equipment recently taken out of service from Sinclair Pipe Line Co's. former main crude trunk lines from Humbolt, Kansas, to Wilmington, Illinois. All equipment was in first-class operating condition when system recently discontinued. Detailed specifications and prices available on request:

Write - Call - Wire

HUMBOLDT-CHICAGO PIPE LINE PROJECT

216 W. 2nd St. Tulsa, Okla. Phone: 3-5400

Equipment Values!

D7 TRACTOR—Cat Diesel, serial #3T4962; current series D7, equipped with 22″ grousers, crankcase guard, front pull hook, heavy duty equalizer spring, top crank for starting. Has LaPlant-Choate hyd. angledozer and control unit w/ radiator guard. Engine overhauled, bearings replaced new; transmission, master and steering clutches in good shape; tracks above-average. FOB Louisville **$7,850.00**

AIR COMPRESSOR—Gardner-Denver 500 ft. portable, ser. #154231, powered by Cat D13000 Diesel eng. Latest multiple cylinder design, mounted on four 7.50x20 pneumatic tires. All water-cooled unit; 2 yrs. old. True hourmeter reading of 3850. A-1 mechanically and a rare value. FOB Ashland, Ky. **$5,950.00**

TD18 Tractor—International, ser. #TDR-14520-T7CE, equipped with Bucyrus-Erie cable angledozer and DDPCU. Has crankcase guard, front pull hook, 18″ grousers, starter, generator, battery. Completely reconditioned and nine new bottom rollers installed, also new fuel injection system. FOB Louisville **$5,250.00**

POWER UNIT—Cat Diesel D17000, ser. #3S1761; 8-cyl., V-type Diesel eng., max. HP 190 at 1000 RPM. With full equipment incl. radiator fan. Has open type clutch with extended base, shaft, pillow blocks, outboard bearing, radiator and fuel tank. Good looking and in excellent condition. FOB Paducah, Ky. **$5,600.00**

ROY C. WHAYNE SUPPLY CO.
800 W. MAIN ST., LOUISVILLE, KY.
EVANSVILLE, IND. PADUCAH, KY. ASHLAND, KY.

EQUIPMENT FOR SALE

FOR SALE

Rambler H-40, IDECO with substructure. Trailer mounted. C 350 Ideal and 7½ x 14 BA Emsco Pumps. Drill Pipe, Rotary Table, Block, Hook, Swivel, Kelly and Light Plant. Cardwell Trailer-Rig. 7¾ x 18 Wheeland and C 12 Emsco Pumps. Drill Pipe, Rotary Table, Block, Hook, Swivel, Kelly and Light Plant. Model R L CARDWELL Spudder, skid mounted with D 13000 Caterpillar Motor. Wilson-Mogul double drum Draw Works with substructure. Mast, GKU Waukesha motor. FRANKS single drum Draw Works with Mast mounted on International L 190 Tandem Truck. Two Drilling in Units consisting of Guiberson Head with Waukesha motor, skid mounted. D. Jack Simmons, P.O. Box 213, Farmington, N. M. Phone 322R.

EVERYTHING in new and used equipment for well drilling. Fishing tools rented. Save money, get quotations from Pressey & Son, Pueblo, Colorado.

JOY 300 Drilling Rig butane powered, mounted on Brockaway 6x6 truck, 3500 feet 3½ inch drill pipe. Auxiliary mud pump and butane engine as separate unit. All tools and equipment included. This rig in first-class working condition and ready to go to work immediately. Call or write Steele Brothers, Crete, Nebraska. Phone 127.

Gaso Duplex 4½" x 6" Power Pumps with Chrysler C-36 Engines, skid mounted, immediate delivery. Also Byron Jackson, Carter Centrifugal Units. Westinghouse 20-25-50 KW Generating Units.

H. H. COFFIELD
Attn.: W. H. ORR
Phones: 132—Rockdale, Texas
AT-3427—Houston, Texas

FOR SALE

New and Used material—Immediate delivery from stock, Angles, Channels, I and WF Beams, especially for construction needs.

H BEAMS **PILE SECTIONS**

Phone or Wire your steel requirements.

We are also interested in purchasing your surplus material. We assure you our prices will be the best obtainable.

CARSAND STEEL CORP.
14-23 34th Avenue
Astoria, New York
Astoria 8-4484 8-8023

EQUIPMENT FOR SALE

FOR SALE: Used PDM-36 Emsco Drawworks with all Chains and Guards TD Reverse Clutch Enclosed Chain Drive Compound Unit with TD Pump Clutch. All Mounted on extra heavy I Beam Skids with 2-D13000 Caterpillar Engines equipped with Caterpillar Clutches, Stub Shafts & Flexible Couplings & Caterpillar Starting Engines. 1—26'x14'x14" I Beam Skid Base for jackknife derrick. Complete price $7500.00. Buckeye Supply Company, Phone 4381, Great Bend, Kansas.

FOR SALE: 5—Shriver 42"x42" cast iron Filter Presses, Plate & Frame Type, 27, and 54 chambers 1" cake; 15—Sperry 18"x18" cast iron Filter Presses, 11 chambers; ±12 Sweetland Filter for 72 monel covered leaves on 2" centers. Immediate shipment. Attractively priced. Consolidated Products Co., Inc., 17-20 Park Row, New York 38, N. Y. BArclay 7-0600.

1—GAK 145 H.P. Waukesha, with twin disc clutch 10" sheave completely overhauled. New crankshaft and never been used since overhauling. $2500.00. 1900 ft. 3½" bottle neck drill pipe, very good cond. $1.45 per ft. 6—V belts like new, ±6340 Type C. $35.00. 1—4"-40' squire kelly, needs some repair, but good for 2000 ft. drilling, $150.00. Box G-616, The Oil and Gas Journal, Tulsa, Oklahoma.

Large Diameter
NEW STEEL PIPE

8⅝"	O.D.	.352 wall	1080 feet
9⅝"	O.D.	.395 wall	800 feet
14"	O.D.	.250 wall	400 feet
24"	O.D.	.201 wall	6000 feet
24"	O.D.	.406 wall	1500 feet
26"	O.D.	.281 wall	2400 feet
28"	O.D.	.281 wall	3000 feet
30"	O.D.	.500 wall	4000 feet

All 40 foot lengths

Small size pipe and tubing also available

Attractively Priced

For Immediate Shipment

Submit your requirements

Write—Wire—Phone

SONKEN-GALAMBA CORPORATION
2nd and Riverview (X-964)
Kansas City 18, Kansas
ATwater 9305

FOR SALE

1094 MILES 8-⅝" O.D. 28.55#
14 MILES 10-¾" O.D. 40.48#
484 MILES 12-¾" O.D. 49.56#

All above pipe is lapweld in approximate 20' random lengths, will be machine cleaned, straightened, and beveled for welding. This pipe is being reclaimed from multiple pipe lines extending from Humbolt, Kansas, to Chicago, Illinois. Pipe now in process being taken up and reconditioned and will be made available for prompt shipment.

Pipe will be offered for outright sale at attractive savings or will consider placing pipe in oil, gas, or water systems.

For Further Information: Write - Call - Wire

HUMBOLDT-CHICAGO PIPE LINE PROJECT

216 W. 2nd St., Tulsa, Okla. Phone 3-5400

EQUIPMENT FOR SALE

FOR SALE: 1—36-P Oilwell 3" x 6" Triplex Power Pump with bronze fluid end, porcelain plungers and slush type valves. Can also furnish Electric Motor, controls, drive, skids, etc. This item priced for quick sale. Box G-609, The Oil and Gas Journal, Tulsa, Oklahoma.

WANT EQUIPMENT: Did you find the equipment you wish to purchase in this column? If not, use an "Equipment Wanted" classified advertisement to find it. It is available somewhere and Journal classified advertisements will find it. See box heading for classified rates, or write The Oil and Gas Journal.

FOR SALE
DIESELS AND PUMPS

Two new 1947 unused 475 BHP 5 cylinder Baldwin Model VG Diesel Engines, each connected to Worthington Horizontal Triplex Double Acting Pump, both units with Falk Couplings and other accessories. Location Ohio, immediate delivery. Direct inquiries to

THE BUCKEYE PIPE LINE CO.
Joseph Steele, Purchasing Agent
Room 2200, 30 Broad St.
New York 4, N. Y.

USED PIPE FOR SALE

We have been taking up several miles of our oil and gas lines in this district and have for sale considerable very good used pipe, as listed below:

2,500' 6⅝" o.d. bevelled. Good.
15,000' 6" o.d. straight, bevelled. Good.
12,000' 5⅝" o.d. straight, bevelled and good.
4,000' 4½" o.d. very heavy.
15,000' 4" o.d. steel pipe.
1,500' 3" i.d. very heavy; splendid casing.
4,000' 2½" plain end, good as new.
20,000' 2" long collars, good threads straight line pipe.
5,000' 2" oil well tubing.
2,000' ⅜" pipe.
700' 4⅞" casing.
2,000' 6¼" casing.

THE ALLEN GAS CORPORATION
Paola, Kansas

FOR SALE

COMPLETE WATER FLOODING PLANT IN OPERATION LESS THAN TWELVE MONTHS. LOCATED IN TILLMAN COUNTY, OKLAHOMA

1—Aldrich Direct Flow Pump 2½" x 5" 108 GPM 1320± Cont. Duty.

1—LeRoi H-540 Engine.

2—72" x 40" National Filtering Tanks.

2—16' x 16' Open Top Redwood Tanks.

Centrifugal Pumps; Electric Motors; Pittsburgh Meters, and Miscellaneous fittings. All in A-1 Condition.

WOLFSON OIL COMPANY

P. O. Box 1144
Wichita Falls, Texas

EQUIPMENT WANTED

WILL PAY highest prices for used casing, used line pipe, abandoned leases, or other surplus lease equipment. Your idle producing equipment is worth dollars. Green Pipe & Supply Co., Box 1383, Tulsa, Oklahoma.

WANTED

150 GPM LP Gas Dehydration Unit
300# WP Vessels 4' x 10' to 6' x 15'.

ANCHOR PETROLEUM COMPANY
Atlas Life Bldg., Tulsa, Oklahoma

EQUIPMENT WANTED

NOTICE: We buy. We sell equipment everywhere. If you want to sell or buy, contact Pressey & Son, Pueblo, Colorado.

WILL PAY highest prices for used casing, used line pipe, abandoned leases. Gore Oil Field Supplies, Box 1063, Tulsa, Oklahoma.

USED ROTARY TABLE, kelly, swivel, tubing block, and mud pump for workover service. Lee, Box 2903, Beaumont, Texas.

EQUIPMENT NOT IN USE. Did you find a buyer in this column for the equipment you have for sale? Someone wants it and an "Equipment For Sale" classified advertisement in the Journal will find a buyer. See box heading for classified rates or write The Oil and Gas Journal.

HELP WANTED

MICROPALEONTOLOGIST

Preferably with an advanced degree and a minimum of 5 years' commercial or academic experience. To work in the New York research laboratory of a major oil company. This position demands broad interests in Stratigraphy and Biofacies and the capacity to do independent work on projects assigned. Salary dependent on experience and qualifications.

Write giving personal history and work experience. Please include telephone number.

RECRUITING SUPERVISOR
BOX OGJ

Arabian - American
Oil Company

505 Park Avenue

New York 22, N. Y.

PARTY CHIEFS AND COMPUTERS

Established contracting company has limited number of openings with good future for well qualified interpretative personnel. Give all details of education and experience in reply.

Box G-615, The Oil and Gas Journal
Tulsa, Oklahoma

GAS ENGINEER

Growing natural gas company located in north central area has opening for gas engineer experienced in preparation of material for presentation before regulatory bodies and in natural gas transmission or distribution operations. Salary commensurate with ability and experience. Replies confidential.

Box G-611, The Oil and Gas Journal,
Tulsa 1, Oklahoma

HELP WANTED

OIL Industry Employment Service, 405 Tuloma Bldg., Tulsa, Okla. 4-5974. Tom Robinson, owner. For Technical and Trained Personnel, including LPG.

SOUTH AMERICA. These jobs are with one of the better oil companies. Our fee paid. Mechanical Engineer—graduate, no experience required. Petroleum Engineer—graduate, no experience required. Chemical Engineer—graduate, no experience required. Mud Technician—two or more years' experience, single. Accountant—college graduate, Accounting major, single. All information confidential and should be mailed to CHAS. J. LOVELESS PERSONNEL SERVICE, 616 S. Main, Tulsa, Oklahoma. Phone 3-5168.

REPRESENTATIVES WANTED

To sell the well known line of ROSCO Oil Field Canvas Rig Covers, Windbreaks and Portable Frames in areas where we are not now represented.

Our covers and Windbreaks are seamed with Orlon and guaranteed against seams ripping for the life of the cover.

Exclusive Territory
Supply Store Distribution
Competitive Prices
Liberal Commissions

Write ROSCO
PO Box 892, Oklahoma City

LARGE INDEPENDENT OIL CORPORATION

...has openings for three junior engineers who are interested in refining operations. Location of employment will be in large central Oklahoma refinery in a new technical service that is being developed.

These positions involve technical service work in crude distillation; catalytic cracking; gas recovery; polymerization; H-F Alkylation; and delayed coking.

Applicants must be refining, mechanical, or chemical engineering graduates. These are permanent positions with a young, progressive company and offer excellent opportunity for experience and for advancement in an expanding organization. Give details of experience and salary expected.

Box G-567, The Oil and Gas Journal,
Tulsa, Oklahoma

EQUIPMENT INSPECTION ENGINEERS
SOUTH AMERICA

A major oil company affiliated with Standard Oil Company (N.J.) needs graduate engineers with several years' refinery process equipment inspection experience. Must be qualified to interpret codes and specifications, predict equipment renewals, and recommend replacement equipment.

Write giving age, marital status, education, and full details of experience.

Box 308-K
Radio City Station,
New York 19, N. Y.

HELP WANTED

WANTED: Petroleum or Mechanical Engineers for oil tool design. Field experience desirable. State age, education, experience and salary expected. Box G-556, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Graduate electrical, civil or mechanical engineer for office and field work by major oil company in Middle West. Please state age, experience and educational qualifications. Box G-619, The Oil and Gas Journal, Tulsa, Oklahoma.

GRADUATE ENGINEER

Growing natural gas company located in north central area has opening for recent graduate for engineering work in connection with natural gas transmission and distribution operations. Some experience in field desirable but not essential. Salary commensurate with ability and experience. Replies confidential.

Box G-612, The Oil and Gas Journal,
Tulsa 1, Oklahoma

SUBSURFACE GEOLOGIST

With degree in Geology and a minimum of 3 years' subsurface experience on deep wells. To work in Saudi Arabia on deep wells making lithologic and faunal logs from cores and cuttings, interpreting electrical logs and working on field and regional stratigraphic studies. Salary commensurate with experience and qualifications.

Write giving personal history and work experience. Please include telephone number.

RECRUITING SUPERVISOR
BOX OGJ

Arabian - American
Oil Company

505 Park Avenue

New York 22, N. Y.

FIELD ENGINEER

Mechanical or Chemical, with refinery experience to provide technical field service on installation and operation of furnaces and combustion equipment in the refining and chemical industries. Knowledge of instrumentation helpful. Must be personable and willing to travel. Please send complete resume giving age, education, experience, and salary history. Excellent opportunity for advancement. All replies strictly confidential.

PETRO-CHEM DEVELOPMENT COMPANY
Incorporated
122 East 42nd St., N. Y. 17, N. Y.

HELP WANTED

PROCESS

DESIGN ENGINEER

PETROLEUM REFINING

Large N.Y. engineering firm has a vacancy for graduate chemical engineer with 3 to 4 yrs. exp. in Catalytic & light ends. State educ. exp. in detail & sal. requirements.

Box 980 Realservice
110 West 34th St., N.Y.C.

PETROLEUM ENGINEERS

FOREIGN SERVICE

Graduate engineers with good background in general physics, mathematics, mechanics and with some laboratory experience in equipment and techniques. For laboratory position responsible for theoretical experimental studies on reservoir fluid and rocks. Duties will consist of designing equipment, performing or supervising, testing and analyzing and reporting results. Studies pertinent to evaluation of primary depletion practices and applicability of secondary recovery for pressure maintenance operation will be required.

Please write giving full particulars regarding personal history and work experience. Please include telephone number.

RECRUITING SUPERVISOR
BOX OG-5
Arabian-American Oil Company
505 Park Avenue
New York 22, N. Y.

Now . . . 3 Fine Job Opportunities with Fast Growing INDEPENDENT REFINERY

just completing modern Catalytic Cracking Unit, as first phase in large expansion program. Located in Minnesota, new refining center for North Dakota and Canadian production.

TOPPING UNIT SUPT.
Must have B.S. degree in Engineering and 5 years refinery experience. Give complete details on experience and education.

MAINTENANCE SUPT.
To take charge of maintenance, the construction of plant additions, and supervise the purchase of materials and equipment and inspect work performed under contract. B.S. degree in engineering preferred. Must have 5 years experience in refinery maintenance and construction or operation.

TECHNOLOGIST
Must have degree in Chemistry or Chemical Engineering, with 2 years refinery experience in laboratory or engineering work. Should be able to handle crude oil and process evaluations and related studies.

WRITE TODAY!
You'll enjoy working at this modern refinery as a member of a "team" of progressive people. And your family will enjoy living in Minnesota, "Land of 10,000 Lakes." Refinery is located just outside the Twin Cities.
Write in full confidence to:

Personnel Manager
NORTHWESTERN REFINING CO.
St. Paul Park, Minn.

HELP WANTED

SALES ENGINEER—to represent manufacturer plastic pipe, Mid-Continent, Gulf Coast, West Texas. Box G-585, The Oil and Gas Journal, Tulsa, Oklahoma.

PLANT SUPERINTENDENT wanted for small gasoline plant. Must have good engine operation background. State experience in full. Box G-604, The Oil and Gas Journal, Tulsa, Oklahoma.

FOREIGN EMPLOYMENT. List of oil companies and drilling contractors showing where to apply for foreign jobs. OIML Co., Box 2603, Tulsa, Okla. $5.00 cash.

WANTED: Superintendent take charge of limited drilling program and production, in Illinois, Lawrenceville-Robinson area. Prefer man with water-flood experience. Give complete brief of experience and personal data in letter: Red Head Oil Producing Company, Brilliant, Ohio. Replies confidential!

PLANT OPERATORS WANTED for absorption plant. Must be able to operate compressor equipment. Give full information in first letter. Box G-603, The Oil and Gas Journal, Tulsa, Oklahoma.

THE POSITION YOU WANT: Oil industry companies are looking for men to fill every conceivable kind of position. If you didn't find the position in this column that you are looking for, use a "Situation Wanted" classified advertisement to state your qualifications. Some company is probably looking for your ability. See box heading for classified rates or write The Oil and Gas Journal.

GAS LIFT ENGINEER

Must have actual experience in design and installation of gas lift equipment and complete gas lift systems. Sales experience desirable but not essential. Forward application with resume of training and business experience to E. L. Andrews. Replies held confidential if requested.

DRESSER INDUSTRIES, INC.
Atlantic Building
Dallas 1, Texas

ESTIMATORS

Young engineers capable of mechanical estimating for construction of refineries, steam power and similar industrial projects. Must have some field experience. Considerable weight given to ambition, intelligence and interest in estimating and cost analysis.

BECHTEL CORPORATION
220 Bush Street
San Francisco, California

SITUATIONS WANTED

GEOLOGIST: 7 years experience in all phases petroleum exploration and exploitation, age 34, excellent physical condition. Desires foreign employment on either salary or retainer basis. Prefer South America or Canada. Box G-583, The Oil and Gas Journal, Tulsa, Oklahoma.

CHEMICAL ENGINEER, age 39. Presently employed as a Chief Project Engineer. Twenty years experience in operation, maintenance and design of Pipe Lines, Gasoline plants, Refineries, and Petro-Chemical plants. Desires responsible position with a progressive Oil Company operating in Canada. Box G-595, The Oil and Gas Journal, Tulsa, Oklahoma.

LANDMAN: Seven years experience all phases field operations and office procedures major company land department. Presently assigned to field. College and legal background. Licensed attorney. Location optional and extensive travel satisfactory. Desires change to expanding production company or substantial independent operator. Box G-598, The Oil and Gas Journal, Tulsa, Oklahoma.

SITUATIONS WANTED

ATTENTION: Well established oil well drilling contractor desires to manage and supervise: Individuals', groups', small or medium-sized oil companies' drilling, production and operating problems in Central and Western Texas, and New Mexico. Personal interview by appointment is desired. Makin Drilling Company, Box No. 1628, Ph. No. 3-3141, Hobbs, New Mexico.

EXECUTIVE ACCOUNTANT, oil and drilling experience, C. P. A., available soon. Write Box G-620, The Oil and Gas Journal, Tulsa, Oklahoma.

HAVE BEEN in the oil and gas business 18 years. 10 years right-of-way, claims and leases; 4 years Asst. Supt. of Land Dept.; 4 years Gen. Mgr. of aggressive independent company. Box G-618, The Oil and Gas Journal, Tulsa, Oklahoma.

CHEMICAL ENGINEER with 6 years supervisory experience in mud control and drilling problems desires job with good future and probable stable location. Married, age 34. Box G-613, The Oil and Gas Journal, Tulsa, Oklahoma.

SALES REPRESENTATIVE position with oil field equipment or specialties company, prefer Oklahoma. Engineering degree, 3 years sales engineering field experience. Age 30, married. Box G-587, The Oil and Gas Journal, Tulsa, Oklahoma.

LANDMAN desires new connection. Right-of-way experience, veteran, 27, married, college background. References. Box G-605, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOPHYSICIST—Desires position with independent or small oil company as sole geophysicist or directly under chief geophysicist. Eight years seismic plus five years electronic experience. For seismic crew supervision and record review. Box G-607, The Oil and Gas Journal, Tulsa, Oklahoma.

TREASURER, Comptroller, Secretary or key job by C.P.A. with experience in all departments. Please reply to Box G-597, The Oil and Gas Journal, Tulsa, Oklahoma.

THE RIGHT MAN: Can you fill the position you have open from the qualifications listed in this column? Men are always looking for an opportunity to improve themselves. Use a "Help Wanted" Journal classified advertisement to find the men you need. See box heading for classified rates or write The Oil and Gas Journal.

LEASE AND DRILLING BLOCKS

MAKE ME A DEAL to drill NE¼ and E½ of NW¼ (240 Acres) Section 22, Township 10S, Range 1W, Ottawa Co., Kansas. C. W. Proctor, 3211 S.W. 9th St., Des Moines, Iowa.

WILL pay cash instantly for leases (large blocks), royalties, mineral deeds, production. Write fully—P. O. Box 2153, Denver, Colorado.

LEASES ROYALTIES

Producing and Nonproducing

Bought and Sold—Any Area

Inquiries Invited

B. D. BUCKLEY

6635 Delmar Ave., St. Louis 5, Mo.

COURT SALE

To be sold to highest bidder on August 12, 1953, at 10:00 A.M. at Courthouse, Pawhuska, Oklahoma: 6 producing leases in Osage County containing 960 acres with 15 wells, or 13 net working interest wells to interest being sold, with current net daily average production of approximately 26 barrels. Also 16 non-producing leases containing 2,560 acres including 160 acre lease with 5 producing offset wells. For further information contact E. E. Kirkpatrick, Special Master, Phone 797, Box 748, Pawhuska, Oklahoma.

LEASE AND DRILLING BLOCKS

CHAVES COUNTY, New Mexico, 40 acre Oil & Gas Lease. SW 4 NW 4, Sec. 36, 6S, 30E. 2 miles northwest of recent Forest Oil Company flowing discovery. 1961 expiration. $75 an acre. Box G-614, The Oil and Gas Journal, Tulsa, Oklahoma.

SEE A. L. Bowles, Rollow Building, Ada, Oklahoma, for drilling deals.

OPERATOR wanted to wildcat Tennessee acreage over Oil-Gas seepages. Valuable gas market adjacent. E. A. Munyan, 102 Fairview Drive, Fairfax, Va.

ALL TENNESSEE production is shallow. Get it on my structures—as others do. N. M. Sauls, Geologist, Cookeville, Tenn.

FOR SALE: Oil Leases—997 acres, 473 wells, 500 additional proven acres to be drilled for Secondary Recovery, 4 water pressure plants, completely electrified, 45 core tests on various leases. $275,000 or best offer takes all. Paul R. Baldwin, Baldwin Producing Corporation, Route 5, Medina, Ohio.

LOOKING FOR A LEASE? There will be over 40,000 wells drilled this year. If you are looking for a lease, drilling block, or drilling deal and haven't found it in this column, or if you have a lease or drilling block you want drilled, a Journal classified advertisement can find an interested party. See box heading for classified rates, or write The Oil and Gas Journal.

ROYALTIES

PRODUCING ROYALTY and overrides for sale. Wire-write-call for particulars. JACK EAGLE, 706 City Natl. Bldg., Okla City, Okla. REgent 6-7027.

IN ELK CITY FIELD, offering royalties ahead of the drill, conditional guarantee with sale, contact owner: A. S. Berry, P. O. Box 1393, Tulsa, Okla.

GET TOGETHER: Both Capital and Royalties are available. If the investment proposition you want isn't listed in this column use a Journal classified advertisement to find it. See box heading for classified rates, or write The Oil and Gas Journal.

BUSINESS OPPORTUNITIES

MANUFACTURERS AGENT. Well established in the oil industry. Interested in pipeline and refinery equipment accounts. Kansas, Texas, Oklahoma and Louisiana. Box G-610, The Oil and Gas Journal, Tulsa, Oklahoma.

OPPORTUNITIES for bank, hotel, cafe, wheat farms, near coming oil field, Middlemust, Little Beaver, in Denver-Julesburg Basin. Drillers wildcat good gold, trend to incorporated, soft watered town. Shindler, Deertrail, Colo.

DOLORES EXPLORATION CO.

will set up and operate

URANIUM

- Exploration Projects
- Surface and Subsurface Geology
- Aerogeological Prospecting
- Drilling Programs, Ore Reserves
- Estimates upon Request
- A.E.C. Experience

Box 973, Beverly Hills, California

ELECTRICAL CONTRACTORS

Office Phone	Res. Phone
5-5315	7-4950

W. L. RATCLIFF COMPANY

ELECTRICAL CONTRACTORS

Industrial—Commercial—Distribution

W. L. Ratcliff	506 Caddo St.
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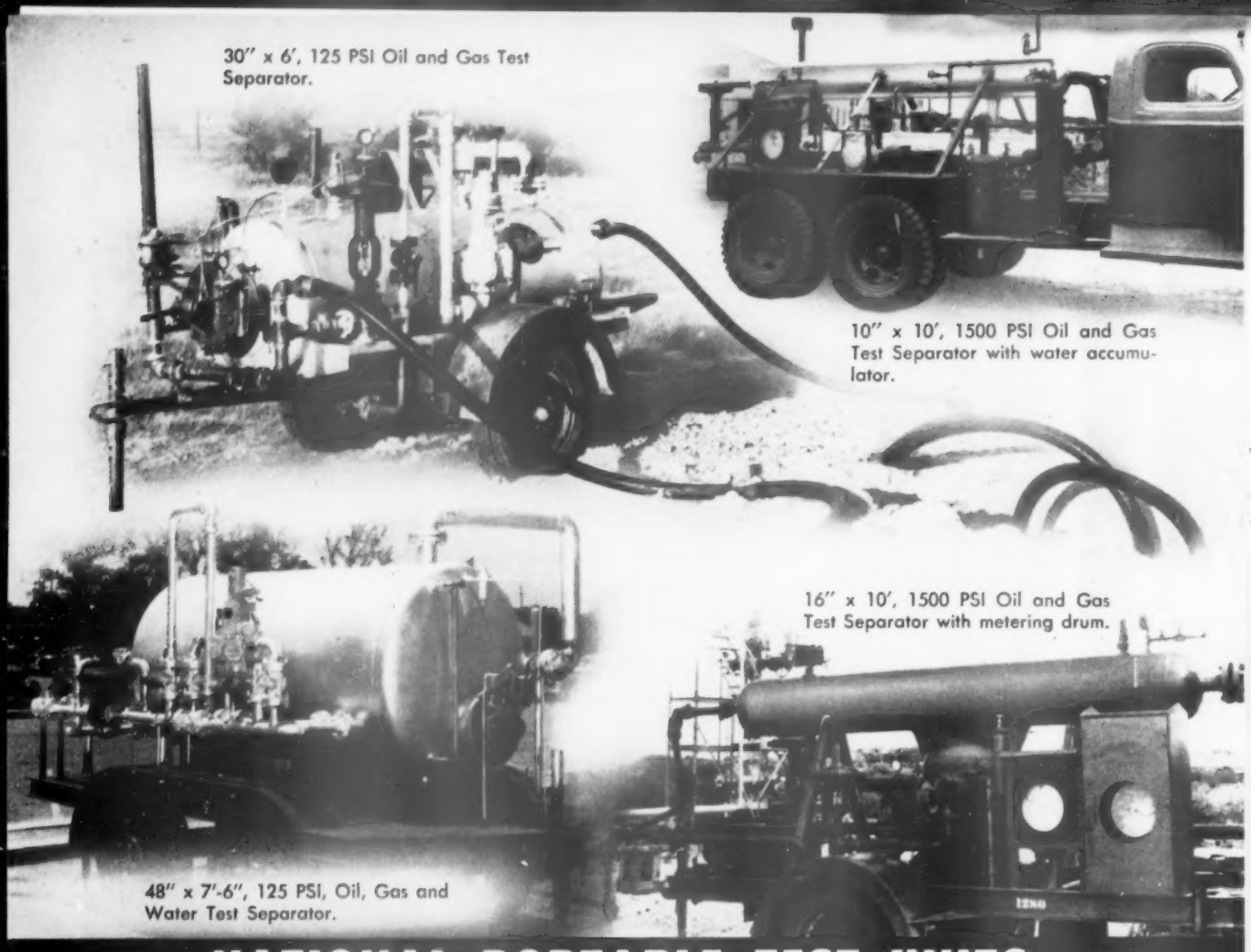
Tracerlab to Complete New Richmond, Calif., Building

Construction in Richmond, Calif., of a new $100,000 building to house Tracerlab, Inc.'s, Western division has been announced by W. E. Barbour, Jr., company president.

The new building will contain approximately 15,400 sq. ft. of floor space and will replace outgrown quarters the company has occupied in Berkeley since 1948. The building is scheduled for completion in November.

Front section of the new structure will be two stories, providing office space on the second floor for the scientific and administrative staffs. The remainder of the building will be devoted to radiochemistry laboratories and facilities for nuclear instrument production and research.

The Western division of Tracerlab employs approximately 60 scientists. Radioactive isotopes processed by the division are widely used throughout the petroleum and other industries.



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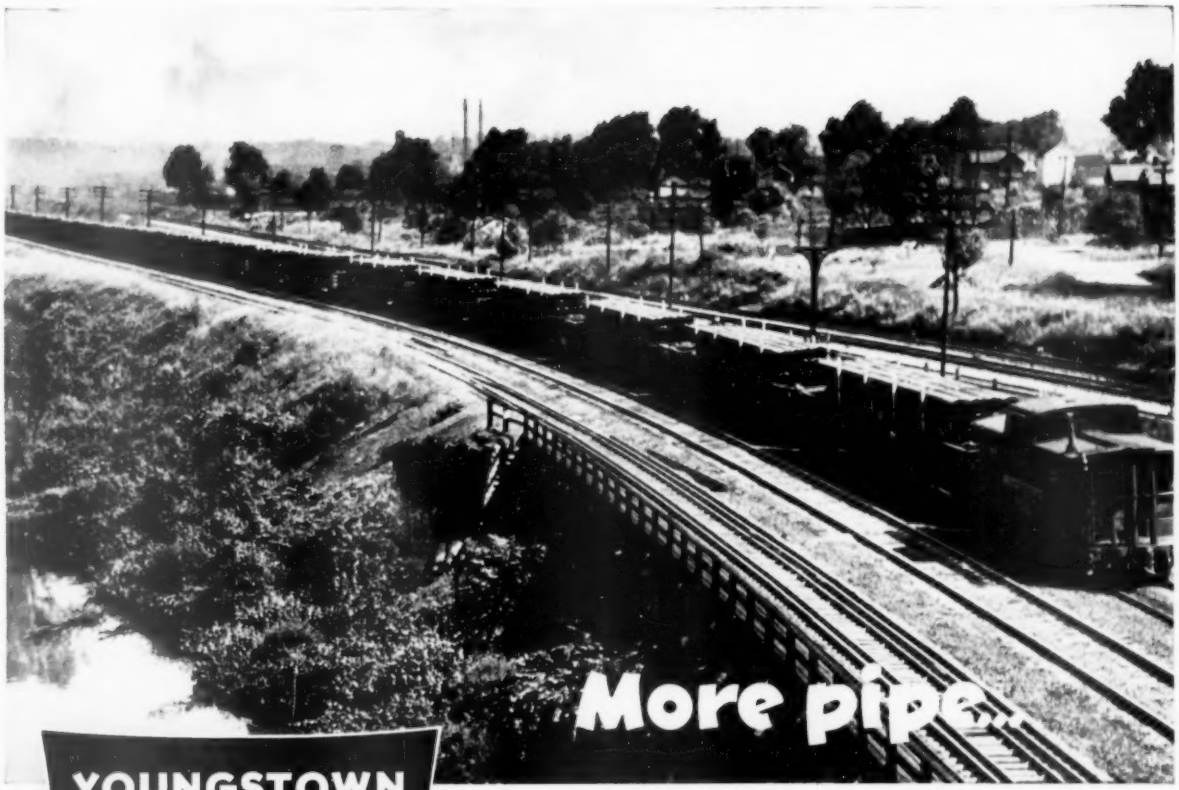

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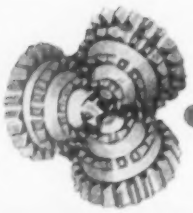

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